Preliminary Copy

This copy is preliminary and subject to changes and revisions before final release.

WARNING

Because of possible shock or fire hazards, connection of this instrument should be performed in compliance with the National Electric Code (ANSI C1) or any other requirements, or both, which may be applicable to the user. Installation, operation, and maintenance should only be performed by qualified personnel.

TM-114600-G1

VOLUME 1-- OPERATOR'S MANUAL

626-PA-6025A

THREE PHASE POWER MONITOR

November, 1989

See opposite side relative to proprietary rights.

NOTE: Refer to Volume 2 of TM-114600-G1 for Service and Maintenance instructions.

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TABLE OF CONTENTS
(Page 1 of 2)

SECTION I GENERAL INFORMATION

Subsection		Page
1.1	**SCOPE**	1-1
1.2	**INTRODUCTION**	1-1
1.3	**PURPOSE**	1-2
1.4	**APPLICATIONS**	1-2
1.5	**DESCRIPTION**	1-3
1.5.1	Plug-in Board	1-3
1.5.2	Transducer Box	1-3
1.5.3	Interface Cable	1-3
1.6	**SPECIFICATION SUMMARY**	1-3
1.7	**STANDARD ACCESSORIES**	1-5
1.8	**OPTIONAL ACCESSORIES**	1-5
1.9	**FACTORY REPAIR**	1-5

SECTION IIINSTALLATION AND OPERATION

Subsection		Page
2.1	**GENERAL**	2-1
2.2	**INSTALLATION**	2-1
2.2.1	Load Ratings	2-1
2.2.2	Installation Warnings	2-1
2.2.3	Installation Procedure	2-2
2.3	**OPERATI0N**	2-6
2.3.1	Mainframe Front Panel Operatiang Controls and Indicators	2-6
2.3.2	Factory Preset Program	2-8
2.3.2.1	Selecting the Factory Preset Program (Locally)	2-8
2.3.2.2	Selecting the Factory Preset Program (Remotely)	2-8
2.3.3	Programming of Full Scale for kW and kVA	2-9
2.3.3.1	F.S. Programming Example One	2-10
2.3.3.2	F.S. Programming Example Two	2-10
2.3.3.3	F.S. Programming Example Three	2-11
2.3.3.4	F.S. Programming Example Four	2-12
2.3.4	Programming Procedure	2-13
2.3.4.1	Programming From Mainframe's Keyboard (Local)	2-14
2.3.4.2	Programming From A PC or Terminal (Remotely)	2-19

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SECTION IIINSTALLATION AND OPERATION (Cont'd)

Subsection		Page
2.3.5	Description of Data Printouts	2-24
2.3.5.1	Over Limit	2-24
2.3.5.2	Under Limit	2-25
2.3.5.3	Output Changes	2-25
2.3.5.4	Data Summary	2-26
2.3.5.5	Printout Modes	2-27

SECTION III OPERATIONAL TEST

Subsection		Page
3.1	**GENERAL**	3-1
3.2	**SYSTEM CHECK**	3-1
3.3	**PLUG-IN SELF DIAGNOSTICS**	3-1
3.4	**CALIBRATION INTERVAL**	3-2

ILLUSTRATIONS AND TABLES

Figure		Page
2-1a	1 ϕ Line to Neutral	2-3
2-1b	1 ϕ Line to Line	2-4
2-1c	Split Phase	2-4
2-1d	3 ϕ Delta	2-5
2-1e	3 ϕ Wye	2-5
2-2	Front Panel of Mainframe	2-7
2-3	1 ϕ Line to Neutral using Average Measurement Scheme	2-13
2-4a	Typical Program Summary Printout - Model 626	2-18
2-4b	Typical Program Summary Printout - Models 626A/G/R/ARA	2-19
2-5	Typical Program Summary Display	2-23
A-1.	Cable Assembly Diagram	A-4

Table		Page
1-1	Table 1-1. 6025A Specifications	1-4
2-1	6025A Operating Controls	2-2

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USER INFORMATION

The Series 626 system is U.L. listed provided that the Mainframe and all plug-ins used are U.L. listed (as indicated by a U.L. listed marking on the Mainframe and each individual plug-in).

Series 626 plug-ins that do not bear the U.L. listed marking are not U.L. listed. Although these plug-ins have been designed for use with the Series 626 and will function properly, such use will void the U.L. listing of the entire Series 626 system.

This equipment generates, uses, and can radiate radio frequency energy. If it is not installed in accordance with this instruction manual, it may interfere with radio communications. The equipment has been tested and found to comply with the limits for a Class A computing device, pursuant to Subpart J of Part 15 of FCC rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. If, however, operation of this equipment in a residential area causes interference, the user, at his or her own expense, must take whatever measures are necessary to correct the interference.

IMPORTANT

The recommended calibration interval for the 626-PA-6025A plug-in is once every 12 **MONTHS**. Refer to Section III, OPERATIONAL TEST, for information on calibration.

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All products of Dranetz Technologies, Inc. are warranted to the original purchaser against defective material and workmanship for a period of one year from the date of delivery. Dranetz will repair or replace, at its option, all defective equipment returned, freight prepaid, during the warranty period, without charge for repair, provided there is no evidence that the equipment has been mishandled or abused. This warranty shall not apply to any defects resulting from improper or inadequate maintenance, buyer-supplied hardware/software interfacing, any unauthorized modification or misuse of the equipment, operation outside of the environmental specifications, or improper site preparation or maintenance.

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VOLUME 1
OPERATOR'S MANUAL

626-PA-6025A 3-PHASE POWER MONITOR

SECTION I
GENERAL INFORMATION

1.1 SCOPE

The manual for this product consists of two volumes. You are reading Volume 1, the Operator's manual, which is divided into three sections:

I. GENERAL INFORMATION
II. INSTALLATION AND OPERATION
III. OPERATIONAL TEST

Volume 2, the Service manual, contains the maintenance and calibration instructions and consists of four sections:

IV. THEORY OF OPERATION
V. MAINTENANCE AND CALIBRATION
VI. REPLACEABLE PARTS
VII. SCHEMATICS AND ASSEMBLIES

1.2 INTRODUCTION

This manual contains the operating instructions for the 626-PA-6025A 3-Phase Power Monitor. The Power Monitor consists of the 626-PA-6025A plug-in, the 626-XD-6025 transducer box, and the interface cable interconnecting the Transducer Box to the plug-in. The 626-PA-6025A will hereinafter be referred to as the 6025A.

The plug-in part of the 6025A is designed for installation in the Series 626 Universal Disturbance Analyzer (Models 626, 626A, 626ARA, 626G, and 626R). (When reading this manual, the terms "Series 626" and "Mainframe" refer to any model of the Series 626 Universal Disturbance Analyzer.)

The Mainframe provides all system functions, including power and real-time clock, for its plug-in modules. It is assumed that the reader is familiar with the information presented in Volume 1 of the Mainframe manual.

A keyboard located on the front panel of Mainframe models 626, 626A, 626ARA, and 626G control Mainframe and plug-in operation.[1] (The Mainframe and plug-ins can also be controlled remotely.)

[1]The 626R Mainframe has no keyboard. It is programmed and controlled remotely.

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Data collected by the 6025A is sent to the Mainframe's internal stack before being printed and/or sent to the Mainframe's RS-232 port.[2]

NOTE: *In this manual, most of the printout examples display two types of printouts placed side by side. These depict the two ways different Mainframe models print. The Model 626 prints from the bottom up, and therefore its printout is read from the bottom up. All other models print from the top down, and therefore their printouts are read from the top down.*

1.3 PURPOSE

The 6025A monitors 50 to 400 Hz 3-phase net real power, total apparent power, and total true RMS current. Voltage and current inputs to the power transducer box are transformer coupled for maximum isolation. The power transducer accepts voltage inputs from 90 to 600 V RMS. A range switch on the plug-in allows the user to change the voltage gain to achieve the greatest accuracy. The current inputs of the power transducer accepts the output of any current probe that has a 5 A RMS Full Scale secondary. The Full Scale value, the maximum and minimum thresholds, and sensitivity are all user programmable for each of the three outputs: kW, Amps, and kVA.

The 626-PA-6025A plug-in receives its input from the 626-XD-6025 transducer box. The transducer box and the plug-in are connected via a cable which can be up to 100 feet long.

The transducer box can be connected to allow monitoring of one of the following configurations: 1 ϕ Line-to-Neutral, 1 ϕ Line to Line, Split Phase, 3 ϕ Delta, or 3 ϕ Wye. Connections between the transducer box and the voltage lines to be monitored should be made via a circuit breaker box.

1.4 APPLICATIONS

When installed in a Series 626 Mainframe, the 6025A provides the capability of monitoring and evaluating systems for energy usage in the forms of real power, current, and apparent power.

The 6025A can be used to perform constant energy monitoring or energy demand surveys. Information provided determines energy consumption limits and their cyclic occurrence. This information can be used to perform load scheduling for shifting or reducing demand peaks to reduce electrical consumption.

The 6025A can be set up to monitor power and current by individual phase, or it can be used to monitor total power and current for a system.

The Mainframe can be accessed remotely using a data terminal. Two different software packages (DAS and DMII) are available from Dranetz Technologies which allow remote access to the Mainframe(s) and retrieval of collected data using a PC. A separate software module (626-SM-6025) can be used with either of these two packages to plot graphs of the 6025A data.

---

[2]Refer to the Mainframe manual for specific information about the internal stack, printer, RS-232 port, and remote communications.

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1.5 DESCRIPTION

The 6025A is comprised of three components: a plug-in board (or module), a transducer box, and an interface cable.

1.5.1 Plug-in Board

The 6025A plug-in module consists of two circuit boards "piggy-backed" together, whose dimension is 6.5" high by 1.25" wide by 10" deep. It is designed for installation in any one of the five slots of the Series 626 Universal Disturbance Analyzer.

The rear panel of the plug-in contains an 8-pin voltage connector and a 6-pin current connector to accept connections from the interface cable leading from the transducer box to the 6025A plug-in.

A HI/LO Range Switch on the plug-in board allows you to increase the accuracy of voltage inputs below 300 V RMS.

1.5.2 Transducer Box

The Transducer Box is a watertight, 8" by 10", hinged NEMA enclosure with a latch.[3] Input terminal blocks for monitoring current (TB1) and voltage (TB2) are accessed through a pre-punched opening in the bottom of the box. The output terminal block (TB3) for the interface cable is accessed through a similar pre-punched opening on the side of the box.

1.5.3 Interface Cable

A 100 foot interface cable is provided for connection between the transducer box and plug-in board. (The cable can be cut to a shorter length if desired.) One end of the interface cable contains two connectors for connection on the rear panel of the 6025A plug-in. The other end of the interface cable consists of twisted pairs of color coded wires for connection to the output terminal block of the transducer box.

1.6 SPECIFICATION SUMMARY

TABLE 1-1 on the following page summarizes the specifications of the 6025A.

[3]To ensure water-tightness, use the strain relief provided for the hole on the side of the transducer box, and use water-tight connectors for the openings at the bottom of the transducer box.

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TABLE 1-1. 6025A SPECIFICATIONS

Configuration:	Module consists of two piggy-backed boards connected to Power transducer via a 6 twisted pair, #22 AWG shielded cable. Cable is terminated with connectors for plug-in and tinned wires for terminal block of Power Transducer. Maximum cable length between plug-in and transducer is 100 feet. Cable is user installed.
Transducer Enclosure:	Watertight, 8" by 10", hinged NEMA enclosure with a latch.
Power Rating:	Maximum of 5 plug-ins per 626 chassis.
Current Crest Factor:	2
Voltage Inputs[4]:	90 - 600 V RMS, Max, 45 - 400 Hz, 3 phase
Current Inputs[4]:	0.5 to 5 A RMS, (10 A peak), 45 - 400 Hz, 3 Phase Can use current probe with 5 amp secondary
Input Impedance:	Voltage: Differential = 1.07 Megohm min Common mode = 50 Gigohm typical Current: Differential Mode = 191 Ohm (plug-in only) = 100 Ohm (plug-in with transducer box attached)
Plug-in Voltage Inputs Common Mode Rejection:	+500 RMS any input to chassis ground
Outputs[5]:	Total I RMS, Net Real Average Power, and Total Apparent Power
Accuracy[6]:	Total I RMS = ±2% of reading ±.25% F.S. W Total = ±2% of reading ±.25% F.S. VA Total = ±2% of reading ±.25% F.S.
Update Rate:	Continuous output from Power Transducer, with four measurements averaged every 240 milliseconds. A different channel's average is updated every 80 milliseconds. All three channels are updated once every 240 milliseconds.
Output Format:	5 digits, range dependent on Full Scale (X.XXXX, XX.XXX, XXX.XX, XXXX.X, XXXXX)
Programmable parameters: 1) Full Scale value	(Independently per channel) User specifies exponent and 3 digits

Exponent	Range	Format
0	1 to 9.99	X.XX00
1	10 to 99.9	XX.X00
2	100 to 999	XXX.00
3	1000 to 9990	XXX0.0
4	10000 to 99900	XXX00

2) Hi Limit (user specifies 4 digits) Range: Lo Limit +1% of F.S. <= Hi Limit <= F.S.

3) Lo Limit (user specifies 4 digits) Range: 0<=Lo Limit <Hi Limit-1% of F.S.

4) Sensitivity (user specifies 4 digits) Range: 1% of F.S. <= Sens < Full Scale

[4] To Power Transducer
[5] From Power Plug-in to Mainframe.
[6] When calculating overall accuracy, include the accuracy of the external current transformer(s) used for measurements.

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1.7 STANDARD ACCESSORIES

Part #	Quantity	Description
TM-114600-G1 Vol. 1	One	6025A Operator's Manual
114602-G1	One	6025A Plug-in Board
114603-G1	One	6025 Transducer Box
114604-G4	One	100 foot Interface Cable for connection between transducer box and plug-in board.

1.8 OPTIONAL ACCESSORIES

See step (3) in Subsection 1.9 for information on how to obtain the Volume 2 (Service/Maintenance) manual listed below.

Part #	Quantity	Description
TM-114600-G1 Vol. 2	One	6025A Service/Maintenance Manual
114604-G5	One	Interface Cable Accessory for connection between transducer box and plug-in board. (Connector parts only: Contains 13-socket contacts; one 8-position connector and strain relief; one 6-position connector and strain relief.)
114390-G1	One	3000 A RMS Current Probe

1.9 FACTORY REPAIR

When factory repair is required, proceed as follows:

1. Contact Dranetz Customer Service Department to obtain an authorization number for Factory repair.

   Telephone No: (201) 287-3680 Telex: 499-7808

   TWX: (710) 997-9553 Cable: DRANETZ

   FAX: (201) 248-9240

2. Fill out the REPAIR/SERVICE ORDER form enclosed in this manual. Ship it along with the malfunctioning equipment to Dranetz Customer Service Department, 4 Gladys Court, Edison, N.J., 08818.

3. In this manual you have been supplied a Control Form with a registration number on it. The purpose of this form is to allow you to obtain the Volume 2 Service/Maintenance manual for the 6025A. Fill out and return this form if you want to obtain the Volume 2 manual. (If this form is missing, contact Dranetz Customer Service Department and request a replacement.)

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REPAIR/SERVICE ORDER FORM

IMPORTANT: Enclose this form with returned equipment (see other side for instructions)

DRANETZ TECHNOLOGIES, INC.
Customer Service Department
4 Gladys Court, P.O. Box 4018
Edison, New Jersey 08818-4018

Tel: (201) 287-3680
FAX: (201) 248-9240

Ship to:_____
_____
_____
_____

Reference/P.O.#_____
Invoice to:_____
_____
_____
_____

EQUIPMENT BEING RETURNED

Model No._____ S/N_____ Model No._____ S/N_____
Model No._____ S/N_____ Model No._____ S/N_____
Model No._____ S/N_____ Model No._____ S/N_____

Accessory equipment also being returned (fill this out to assure return to you):
☐ Power & Other Cables_____ ☐ Instr. Book_____
☐ Other_____

RETURN AUTHORIZATION

If you have discussed the problem with Dranetz Sales or Service personnel, who did you speak with?_____
Dranetz Return Authorization No._____ By_____ Date_____
Who should Dranetz Customer Service contact for technical questions?

_____
Name (please print) Department Telephone Number

DESCRIPTION OF THE PROBLEM

Reason for return: ☐ Defect ☐ Calibration ☐ Battery Replacement
Please provide a detailed description of the problem, including any test data results (service cannot be performed without this information). Attach additional sheets if necessary.

_____
_____
_____
_____

Check where applicable. Is the malfunction related to:
☐ Warm-up ☐ Temperature ☐ Intermittence ☐ Grounding
☐ Mechanical Handling ☐ Visual Defects ☐ Check if Test Data is Attached

INITIATOR OF THIS REPAIR/SERVICE ORDER

_____
Name/Title (please print) Signature Telephone Number

INSTRUCTIONS FOR THE REPAIR/SERVICE ORDER

IMPORTANT: Follow all instructions and use this form to help us help you.

1. Before returning any equipment, call our Customer Service Dept. at (201) 287-3680. Give the service representative the model and serial numbers of your equipment, and any information regarding your problem.

   a. Our specialists may be able to solve your problem without need for equipment return.

   b. If equipment return is necessary, you will be supplied appropriate instructions and authorization information to expedite service.

2. If equipment return is necessary:

   a. Fill out the other side of this form **COMPLETELY**.

   b. Enclose this form inside the shipping carton. If possible, attach this form by masking tape to the equipment.

   c. Ship prepaid (including insurance); we will return prepaid unless you advise us otherwise.

   d. **IMPORTANT** - Pack properly! Dranetz Technologies, Inc. will not be liable for shipping damage.

NOTE:

Within the Continental United States, all material will be returned by Dranetz Technologies, Inc. to you by UPS, UPS Blue, UPS Red, or another carrier chosen by Dranetz unless we are instructed otherwise.

Warranty Information:

Statement of Warranty - All products of Dranetz Technologies, Inc. are warranted to the original purchaser against defective material and workmanship for a period of one year from the date of delivery. Dranetz will repair or replace, at its option, all defective material returned freight prepaid during the warranty period. There is no charge for this repair provided there is no evidence that the equipment has been mishandled or abused.

SECTION II
INSTALLATION AND OPERATION

2.1 GENERAL

This section contains the installation, programming, and operating instructions for the 6025A.

2.2 INSTALLATION

Installation consists of:

1) Installing the plug-in in the Mainframe
2) Connection of transducer inputs to lines to be monitored
3) Connection of transducer outputs to 6025A plug-in (using interface cable P/N 114604-G4).

You should read thorough the entire installation procedure before beginning installation.

2.2.1 Load Ratings

The Series 626 standard Mainframe has an upper limit of the combined total load rating of its installed plug-in modules. The overall Mainframe capacity is set at 20 units. The 6025A has a load rating of 4 units. (Refer to the Mainframe Volume 1 manual for a list of the load ratings of other plug-in modules.)

2.2.2 Installation Warnings

WARNING

Be sure that the Mainframe and all of the power connected to its plug-in modules are first turned off before proceeding with any installation. Power to lines to be monitored should also be off.

Because of possible shock or fire hazards, connection of this instrument should be performed in compliance with the National Electric Code (ANSI C1) and/or any other requirements which are applicable to the user. Installation, operation, and maintenance should be performed ONLY by qualified personnel. Qualifications for performing such procedures should be self-determined.

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2.2.3 Installation Procedure

To install the 6025A plug-in in the Mainframe, proceed as follows:

1) Make sure the Mainframe and all power connected to its plug-ins are turned off.

2) If voltage inputs to the transducer will always be less than 300 V RMS, you may wish to select LO Range from the HI/LO Dip Switch located on the plug-in board.[1]

3) The slots on the rear of the Mainframe are covered with a metal cover plate when they are empty. Remove the cover plate from the slot where you will install the plug-in.

4) Position the top and bottom rear corners of the plug-in in the upper and lower tracks of the slot. Carefully slide the module into the Mainframe until it is firmly seated.

5) Tighten the top and bottom captive screws to secure the plug-in module to the Mainframe. These screws are used to ground the plug-in panel, so use a screwdriver to tighten the screws down securely.

6) Position or mount the transducer box near the area to be monitored.

7) Mount the supplied strain relief (with the 3/4 inch sealing ring and 3/4 inch locknut) at the opening on the side of the transducer box. The interface cable passes through this opening.

8) If desired, cut the interface cable to an appropriate length, measuring the required distance from the connector end of the cable.[2]

9) Insert the bare wire end of the cable through the strain relief (the strain relief must be tightened sufficiently to provide relief and water tightness) in the transducer box and connect the wires to terminal block TB3 according to the colors marked on the PC board and indicated below. Take care to match the appropriate black wire to its corresponding twisted pair colored wire.

6 V Rms MAX	Voltage Phase A+	RED
	Voltage Phase A-	BLACK
	Voltage Phase B+	WHITE
	Voltage Phase B-	BLACK
	Voltage Phase C+	GREEN
	Voltage Phase C-	BLACK
35 mA Rms MAX	Current Phase A+	BLUE
	Current Phase A-	BLACK
	Current Phase B+	YELLOW
	Current Phase B-	BLACK
	Current Phase C+	BROWN
	Current Phase C-	BLACK

[1]Default value is HI Range. Refer to the Volume II manual for information regarding this switch. (Do NOT exceed 300 V RMS at the transducer box when in low range.)

[2]Refer to Appendix A, steps 12 and 13, for information on preparing the bare wire end of the cable after cutting.

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10) Plug the connector end of the interface cable into the plug-in.

11) The transducer box should be connected to the lines being monitored according to one of the following configurations: 1 ϕ Line to Neutral, 1 ϕ Line to Line, Split Phase, 3 ϕ Delta, or 3 ϕ Wye. Refer to FIGURES 2-1a through 2-1e for the proper wiring diagrams for input connections to the Transducer Box according to the circuit configuration being wired.

NOTE: ***Current probes to be input should be off-line before connecting to transducer box.*** *Connect the secondary of each current transformer to the appropriate terminals of TB1.*

Voltage lines should be input to the transducer box through circuit breakers. *The breakers should be off before connecting voltage lines to transducer box. Connect the voltage inputs to the appropriate terminals of TB2.*

Wires for connection from the transducer box to the monitored power line are passed through openings in bottom of box (left hole for TB1 and current connections, right hole for TB2 and voltage connections). You should use water-tight connectors at these openings.

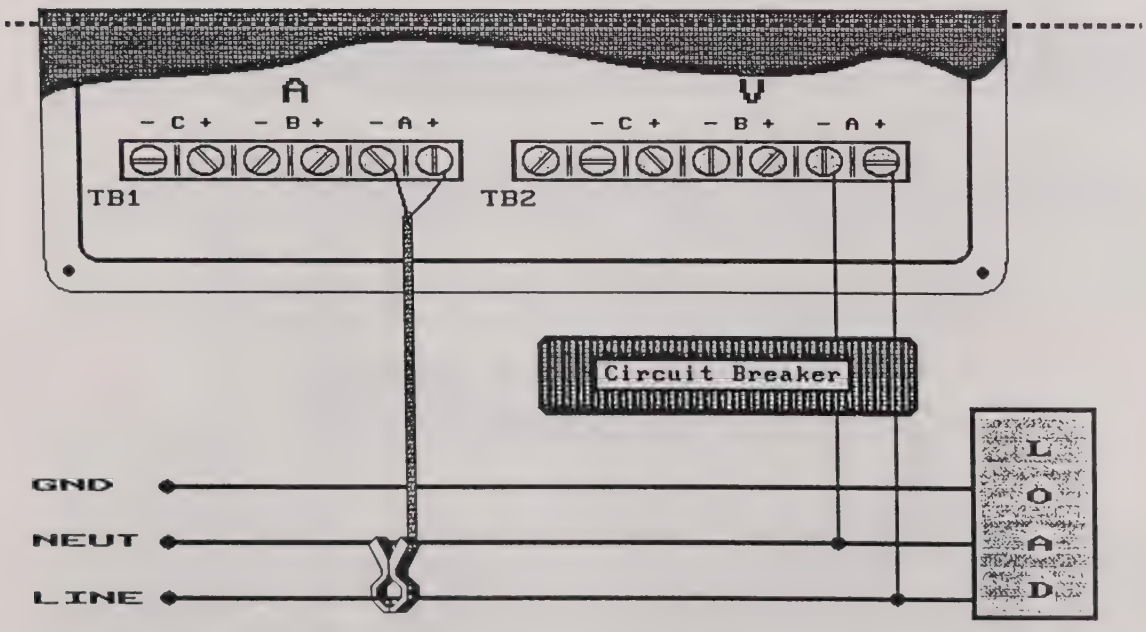

FIGURE 2-1a. 1 ϕ LINE TO NEUTRAL

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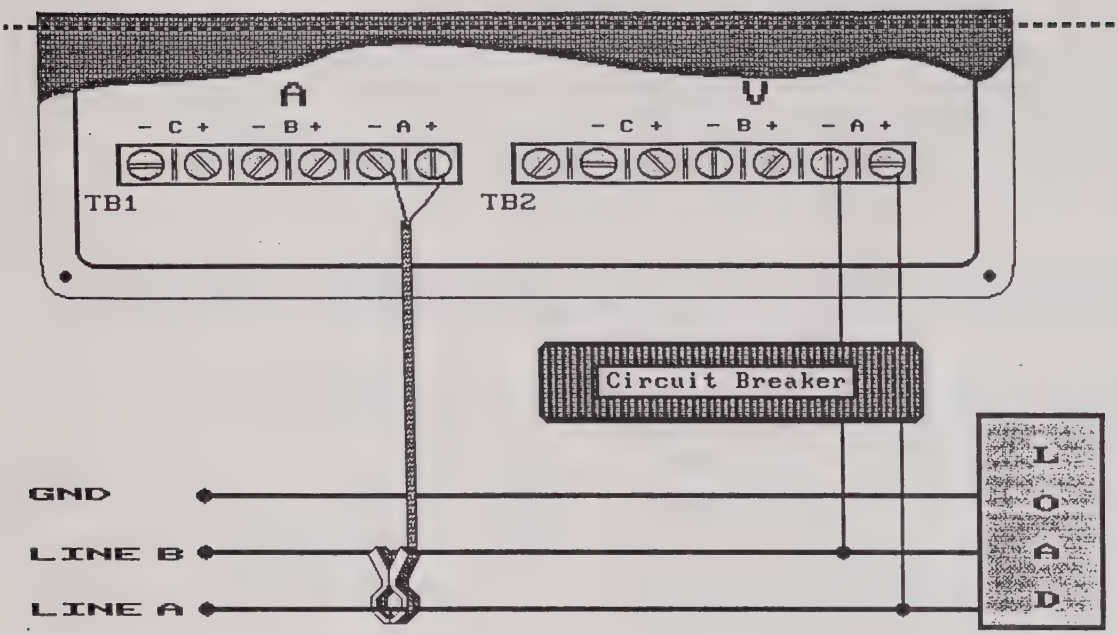

FIGURE 2-1b 1 ϕ LINE TO LINE

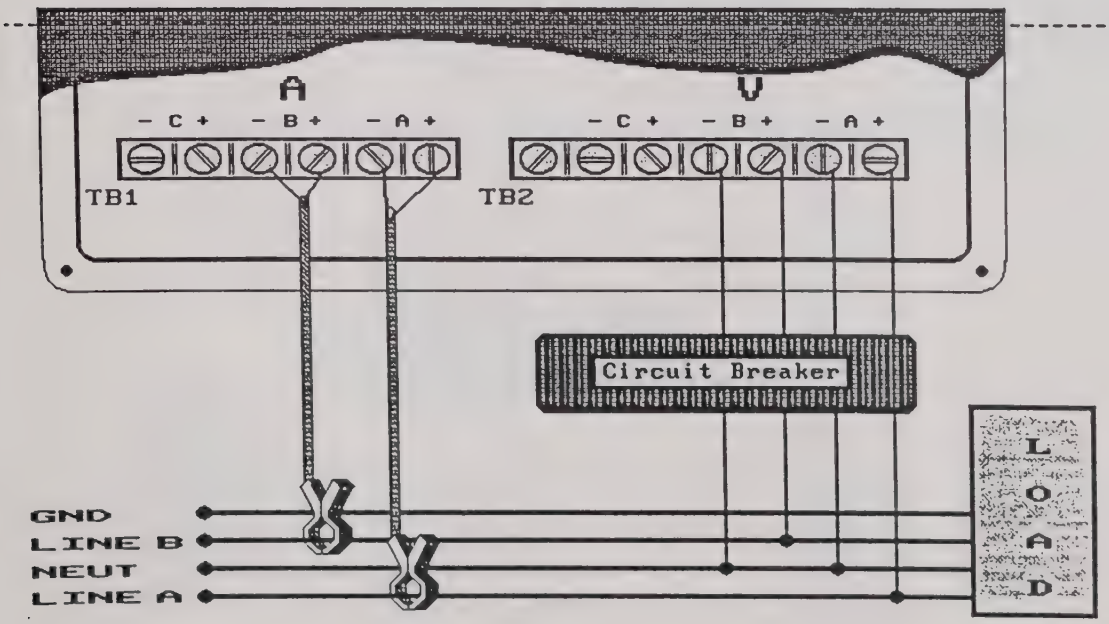

FIGURE 2-1c SPLIT PHASE

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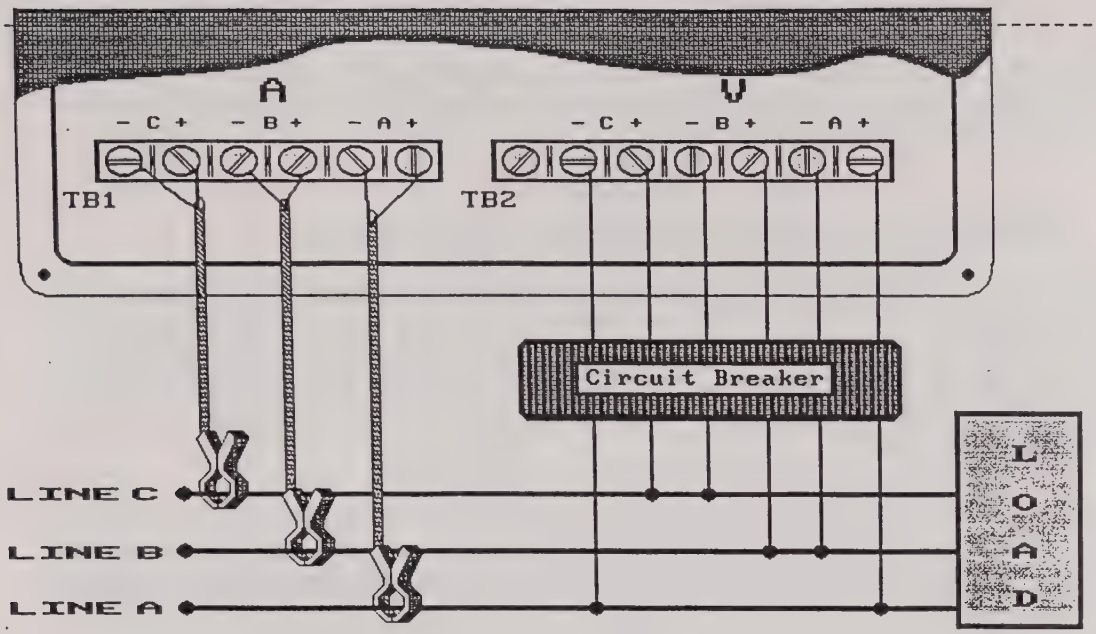

FIGURE 2-1d 3 ϕ DELTA

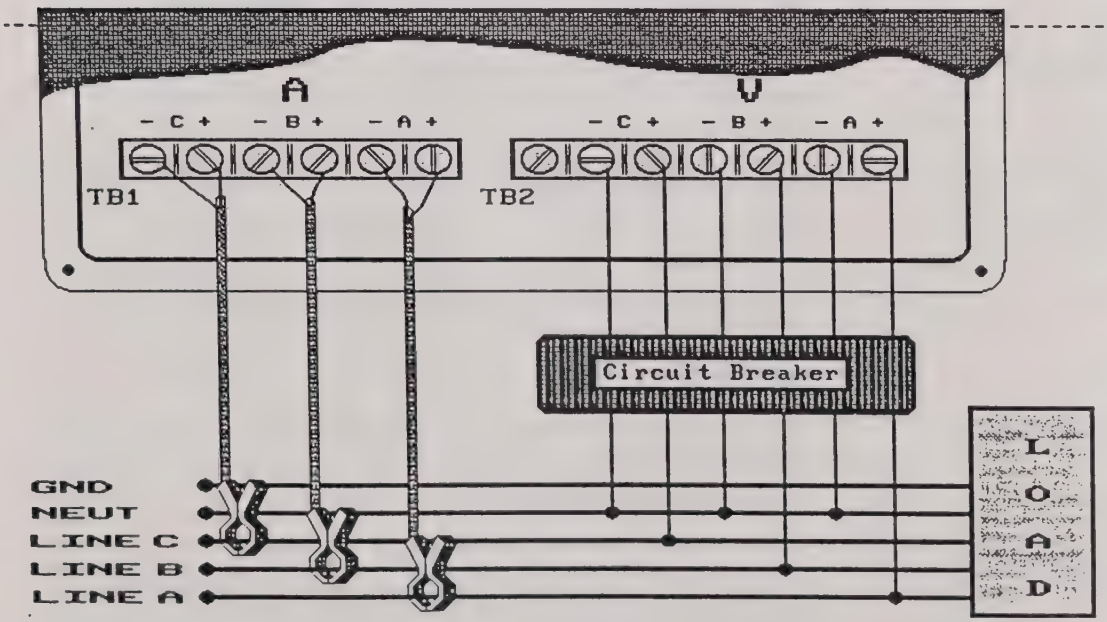

FIGURE 2-1e 3 ϕ WYE

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2.3 OPERATION

The following information is presented to give an overview of the 6025A's operation. Programming of the 6025A is performed either locally through the Mainframe's front panel keyboard or remotely though a terminal or PC.

2.3.1 Mainframe Front Panel Operating Controls and Indicators

The functions of the Mainframe operating controls and indicators associated with the 6025A are described in TABLE 2-1. FIGURE 2-2 shows the typical front panel controls associated with a 6025A. To simplify programming, LED indicators adjacent to the three centrally located key groups cue the Operator during the programming steps. During the interactive programming sequence, the indicators light when keys should be pressed, and go out one by one as the Operator makes the selections.

For a description of controls common to overall Series 626 operation, refer to Volume 1 of the Mainframe manual. For examples of programming the 6025A plug-in using the Mainframe keyboard, refer to sections 2.3.4.1. However, if it is desired to program the 6025A plug-in remotely, refer to sections 2.3.4.2.

TABLE 2-1 6025A OPERATING CONTROLS.

Key	Function
INPUT (red)	Used to input entries for programmed outputs. When pressed (when the red LED next to it is lit) it allows the user to select which output function (kW, A, kVA) is to be programmed.
NUMERIC (yellow)	When single lamp lights, user is cued to press a "1" thru "3" for outputs A thru C, respectively. Also used to enter numerical values for other functions.
LO LIMIT (red)	When pressed, enables the numeric keyboard to program low limit for selected output.
HI LIMIT (red)	When pressed, enables the numeric keyboard to program high limit for selected output.
SENS (red)	When pressed, enables the numeric keyboard to program sensitivity for selected output.
FNC (red)	When pressed, allows the user to program Full Scale value for selected output.
ENTER (green)	When pressed, transfers numeric keyboard values into 6025A memory for processing.
DATA (black)	When pressed, produces a data summary printout.
PROG (black)	When pressed, produces a program summary printout.
RESET (black)	With FUNCTION switch set to PROGRAM and a channel switch (1-5) pressed, PRESET switch recalls non-volatile factory program for that channel.

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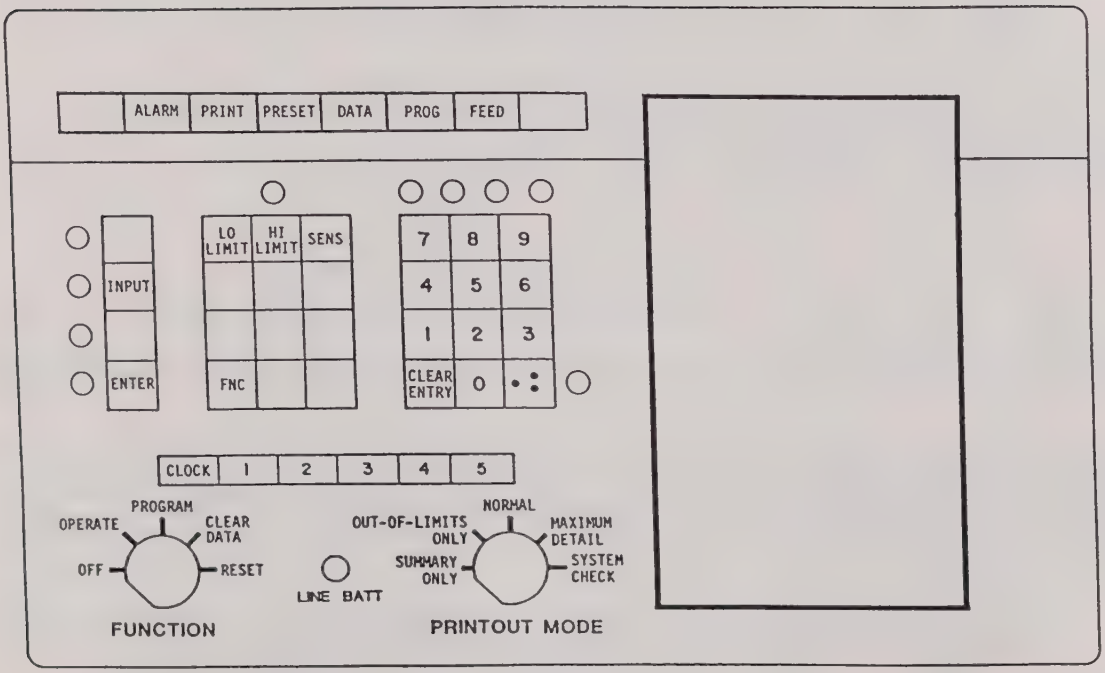

FIGURE 2-2. FRONT PANEL OF MAINFRAME.

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2.3.2 Factory Preset Program

The factory preset program is a default setting for the 6025A plug-in's programmable parameters. The plug-in reverts to the factory preset program whenever a "Memory Invalid" condition exists, or when the Operator presses the PRESET key while in the PROGRAM Mode with the appropriate module selected.

2.3.2.1 Selecting the Factory Preset Program (locally)

To select the factory preset program from the 626 Mainframe's control panel, set the FUNCTION switch to PROGRAM and press the channel number desired. The last operator-set program will be printed out. Now press the PRESET key to recall the factory preset program. An example of the factory preset program appears below.

626

```
F.S. = 1800.0 KVA
HI LMT = 1350.0 KVA
LO LMT = 0450.0 KVA
SENS = 0090.0 KVA
       INPUT C

F.S. = 3000.0 A
HI LMT = 2250.0 A
LO LMT = 0750.0 A
SENS = 0150.0 A
       INPUT B

F.S. = 1800.0 KW
HI LMT = 1350.0 KW
LO LMT = 0450.0 KW
SENS = 0090.0 KW
       INPUT A

     626-PA-6025A
         CH2

PROGRAM SUMMARY
```

626A,G,R,ARA

```
PROGRAM SUMMARY

         CH2
     626-PA-6025A

        INPUT A
SENS = 0090.0 KW
LO LMT = 0450.0 KW
HI LMT = 1350.0 KW
F.S. = 1800.0 KW

        INPUT B
SENS = 0150.0 A
LO LMT = 0750.0 A
HI LMT = 2250.0 A
F.S. = 3000.0 A

        INPUT C
SENS = 0090.0 KVA
LO LMT = 0450.0 KVA
HI LMT = 1350.0 KVA
F.S. = 1800.0 KVA
```

2.3.2.2 Selecting the Factory Preset Program (Remotely)

To select the factory preset program from a terminal (or PC in terminal emulation mode), type "G" for PROGRAM mode and type the channel letter desired (a through e). The last operator-set program will be printed out. Next type "T" to recall the factory preset program. An example of the factory preset program appears on the following page.

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```
PROGRAM SUMMARY

     CH2
626-PA-6025A

       INPUT A
SENS = 0090.0 KW
LO LMT = 0450.0 KW
HI LMT = 1350.0 KW
F.S. = 1800.0 KW

       INPUT B
SENS = 0150.0 A
LO LMT = 0750.0 A
HI LMT = 2250.0 A
F.S. = 3000.0 A

       INPUT C
SENS = 0090.0 KVA
LO LMT = 0450.0 KVA
HI LMT = 1350.0 KVA
F.S. = 1800.0 KVA
```

2.3.3 Programming of Full Scale for kW and kVA

The Full Scale value is programmable by the user for each of the three outputs: kW, Amps, and kVA.

For measuring TOTAL current, the Full Scale value (Amp F.S.) is equivalent to the current transformer's specified Full Scale RMS input (must be a current transformer with a 5 A RMS secondary output) times the number 3 (one for each current input, even though a current may not be connected for measuring).

NOTE: *For system measurements requiring more than one current transformer, all current transformers connected to the transducer box must have the same Full Scale RMS ratings.*

For kW and kVA outputs, the Full Scale value entered during programming depends on the following formula which is printed out when the user is required to calculate the Full Scale value based upon the potential transformer (or voltage) "K" factor, "Amps Full Scale" for current, and a multiplication constant of 0.001 for a units conversion to "KILO."

```
Full Scale
= 0.001*K*600*AMP FS
```

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The K factor for voltage will depend on the step down voltage transformer's "turns" ratio. Determining K factor is required if measuring voltages greater than 600 V RMS. For measurement voltages under 600 V RMS, the K factor = 1.

Example: For a 6000 V to 600 V step down, or a 10:1 "turns" ratio on a Potential Transformer (PT), the K factor = 10.

For measuring an AVERAGE current, the Full Scale value (Amp F.S.) is equivalent to the current transformer's specified Full Scale RMS input (must be a current transformer with a 5 A RMS secondary output) times the number 1.

The following subsections contain examples for calculating the Full Scale (F.S.) values.

2.3.3.1 F.S. Programming Example One

Condition: 3 ϕ Wye or 3 ϕ Delta using 3-1000 A current probes to measure the TOTAL current, the TOTAL real power, and the TOTAL apparent power.

F.S. Calculation & Programming Values:
Since total current is being measured and is the summation of current for each phase, the Full Scale value is calculated as:

F.S. current phase A + F.S. Current Phase B + F.S. Current Phase C

or

1000 Amps + 1000 Amps + 1000 Amps

This gives a value of Amp F.S. = 3000 Amps.

When programming, a value of 3000 would be used for the current Full Scale value (output B). For output A, TOTAL real power in kW, and output C, TOTAL apparent power in kVA, the value used for the Full Scale value would be calculated when the following formula is printed:

```
FCN = FULL SCALE
= 0.001*K*600*AMP FS
```

(Where 3000 would be entered for AMP F.S. when calculating TOTAL kW and TOTAL kVA.)

Refer to FIGURES 2-1d and 2-1e for the wiring configuration.

2.3.3.2 F.S. Programming Example Two

Condition: 3 ϕ Wye or 3 ϕ Delta using 3-1000 A Current Probes to measure the AVERAGE current, the AVERAGE real power, and the AVERAGE apparent power for the system.

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F.S. Calculation & Programming Values:
Since AVERAGE current is being measured and is equal to:

$$\frac{\text{(F.S. Current Phase A + F.S. Current Phase B + F.S. Current Phase C)}}{3}$$

the Full Scale value for programming would be calculated by:

$$\frac{(1000 + 1000 + 1000)}{3}$$

to give a value of AMP F.S. = 1000 Amps.

When programming, a value of 1000 would be used for the current Full Scale value (output B). For output A, AVERAGE real power in kW, and Output C, AVERAGE apparent power in kVA, the value used for Full Scale value would be calculated when the following formula is printed:

```
FCN = FULL SCALE
= 0.001*K*600*AMP FS
```

where 1000 would be entered for AMP F.S. when calculating AVERAGE kW and AVERAGE kVA.

Refer to FIGURES 2-1d and 2-1e for the wiring configuration.

2.3.3.3 F.S. Programming Example Three

NOTE: *Making connections when measuring a single phase voltage are dependent on whether the 6025A is being set up for TOTAL or AVERAGE power measurements for its 3 phase inputs.*

Condition: 1 ϕ measurement Line to Neutral connecting to voltage Phase A using one 1000 A current probe connected to current input phase A to measure the TOTAL current, TOTAL real power, and TOTAL apparent power.

F.S. Calculation & Programming Values:
Since total current is being measured and is the summation of current for each phase, the Full Scale value is calculated the same as for a 3 ϕ system:

(F.S. current Phase A + F.S. current Phase B + F.S. current Phase C)

even though only one phase (phase A) is connected. The Full Scale value is calculated as:

1000 Amps + 1000 Amps + 1000 Amps

to give a value of AMP F.S. = 3000 Amps.

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When programming, a value of 3000 would be used for the current Full Scale value (output B). For output A, TOTAL real power in kW, and output C, TOTAL apparent power in kVA, the value used for Full Scale value would be calculated when the following formula is printed:

```
FCN = FULL SCALE
= 0.001*K*600*AMP FS
```

(Where 3000 would be entered for AMP F.S. when calculating TOTAL kW and TOTAL kVA.)

Refer to FIGURES 2-1a and 2-1b for wiring configuration.

2.3.3.4 F.S. Programming Example Four

NOTE: *Making connections when measuring a single phase voltage are dependent on whether the 6025A is being set up for TOTAL or AVERAGE power measurements for its 3 phase inputs.*

Condition: 1 ϕ measurement Line to Neutral made by connecting point to be measured to transducer box input voltage connections for phase A, phase B, and phase C (parallel connections). One 1000 A current probe is connected in series to current inputs phase A, B, and C. Connections are made as described to allow the plug-in to measure AVERAGE current, AVERAGE real power, and AVERAGE apparent power.

F.S. Calculation & Programming Values:
Since AVERAGE current is being measured and is equal to:

$$\frac{(\text{F.S. Current Phase A} + \text{F.S. Current Phase B} + \text{F.S. Current Phase C})}{3}$$

the Full Scale value for programming would be calculated by:

$$\frac{(1000 + 1000 + 1000)}{3}$$

to give a value of AMP F.S. = 1000 Amps.

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When programming a value of 1000 would be used for the current Full Scale value (output B). For output A, AVERAGE real power in kW, and output C, AVERAGE apparent power in kVA, the value used for Full Scale value would be calculated when the following formula is printed:

```
FCN = FULL SCALE
= 0.001*K*600*AMP FS
```

Where 1000 would be entered for AMP F.S. when calculating AVERAGE kW and AVERAGE kVA.)

Refer to FIGURE 2-3 for the wiring configuration.

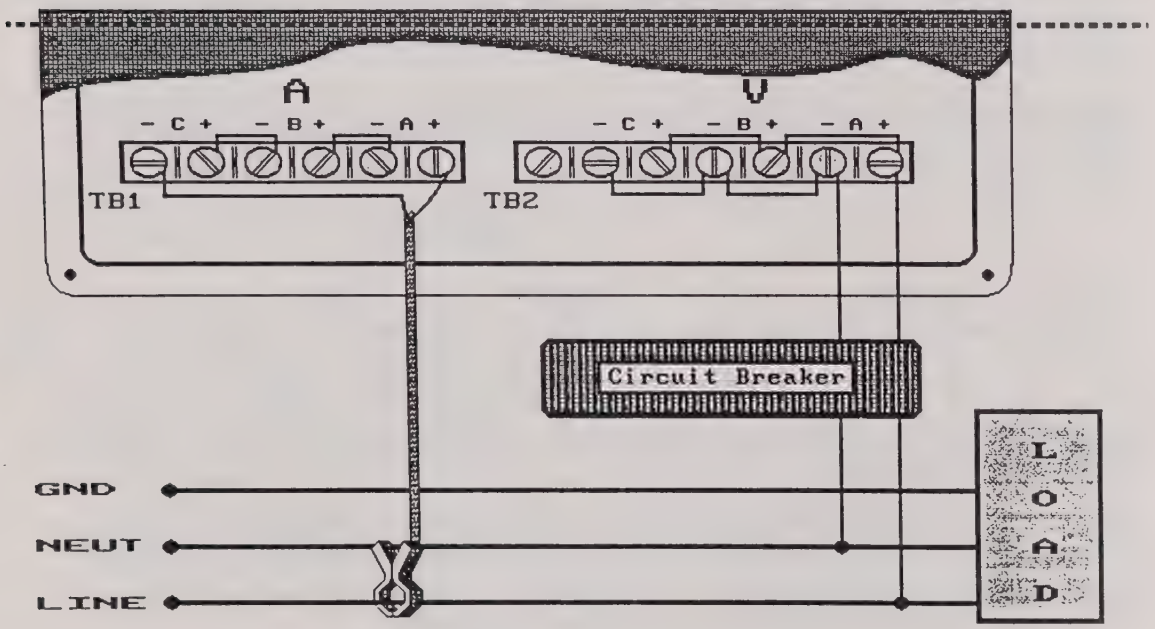

FIGURE 2-3. 1 ϕ LINE TO NEUTRAL
USING AVERAGE MEASUREMENT SCHEME

2.3.4 Programming Procedure

Models 626, 626A, 626G, and 626ARA of the Mainframe can be programmed either locally from the front panel keyboard, or remotely from a PC or Terminal. Model 626R can only be programmed remotely. The steps in both types of programming are very similar. The following subsections contain examples of each method.

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2.3.4.1 Programming From Mainframe's Keyboard (local)

In the example below, assume it is desired to program output B as follows:

Full Scale = 1000 A
High Limit = 750 A
Low Limit = 250 A
Sensitivity = 50 A

To Set the Full Scale Value (to 1000 A)

1. Set FUNCTION switch to PROGRAM.

2. Press the channel (1-5) that corresponds to the slot position of the plug-in to be programmed. A program summary for that channel is printed and the red LED next to the INPUT key lights..

3. Press the INPUT key. The following prompt message is printed and a single yellow LED lights.

626	626A,G,R,ARA
OUTPUTS KW,A,KVA ENTER: 1,2,3, FOR	ENTER: 1,2,3, FOR OUTPUTS KW,A,KVA

4. Press a "1,", "2", or "3", depending on which output you wish to change. (For this example, press "2".) The green LED adjacent to the ENTER key lights, waiting for the ENTER key to be pressed.

5. When the ENTER indicator goes out after the ENTER key is pressed, the message "OUTPUT B" is printed indicating the user selection. Then, a red indicator above the center bank of pushbuttons lights. This indicates that one of the functions (FNC, HI LIMIT, LO LIMIT, SENSITIVITY) may now be programmed.[3]

[3]At this time, the PRESET key could also be pressed to change all of the parameters for all three outputs to factory-preset values.

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6. Press the FNC (function) key. A single yellow LED lights and the following message is printed:

626

```
XXX00. = 4
XXX0.0 = 3
XXX.00 = 2
XX.X00 = 1
X.XX00 = 0
EXP:
FNC = FULL SCALE
```

626A,G,R,ARA

```
FNC = FULL SCALE
EXP:
X.XX00 = 0
XX.X00 = 1
XXX.00 = 2
XXX0.0 = 3
XXX00. = 4
```

NOTE: *If a "1" or "3" was selected in step 4, then the formula "0.001*K*600*AMF F.S." would also printout. The value for Full Scale would have to be calculated using 1000 for AMP F.S. in the Formula.*

7. For this example, press "3". The green indicator lights next to the ENTER key. Pressing the ENTER key allows a Full Scale range in the thousands range to be selected. Three yellow LEDs light, instructing the user to enter the three digits corresponding to the X's in the above printout. In this example, "100" is entered. If an error is made, press CLEAR ENTRY and the correct entry.

NOTE: *Regardless of which exponent you selected in step f, you are always prompted to enter 3 digits. The selection in step f determines where the decimal is. All three digits must be entered, even if they are zeros (0).*

8. When the value is entered, the lamp next to the ENTER key lights. Press this key to enter the value. The minimum Full Scale value that may be entered is 1, 0, 0 (1.00, 10.0, etc.). The following message is printed, displaying the three digits just entered and a reminder to change the other parameters:

```
F.S. = 100
NOTE:  MUST CHANGE
SENS, LO LMT,HI LMT!
```

NOTE: *To view the actual Full Scale value (with decimal point and all digits), press PROGn to print a program display.*

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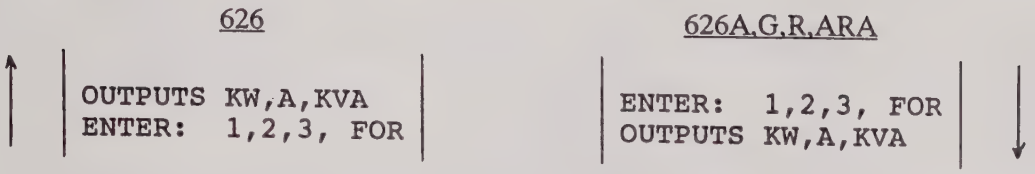
To Set the High Limit Value (to 750 A)[4]

9. The red LED next to the INPUT key is now lit. Press INPUT. The following prompt message is printed and a single yellow LED lights.



10. Press a "1,", "2", or "3", depending on which output you wish to change. (For this example, press "2".) The green LED adjacent to the ENTER key lights, waiting for the ENTER key to be pressed.

11. When the ENTER indicator goes out after the ENTER key is pressed, the message "OUTPUT B" is printed indicating the user selection. Then, a red indicator above the center bank of pushbuttons lights. This indicates that one of the functions (FNC, HI LIMIT, LO LIMIT, SENSITIVITY) may now be programmed.[5]

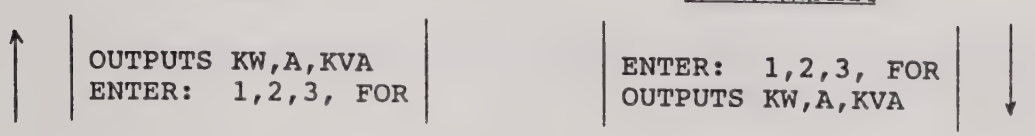
12. Press the HI LIMIT key and the following message appears:

```
HI LMT XXXX.0
```

13. Four yellow LEDs above the numeric keyboard are now lit. (For this example, enter 0750. Values less than 1000 must have leading zero(es) entered.) As each digit is pressed, one less LED is lit to indicate how many digits are left to be pressed. When finished, press the ENTER key. The value you just entered is printed.

To Set the Low Limit Value (to 250 A)[4]

14. The red LED next to the INPUT key is now lit. Press INPUT. The following prompt message is printed and a single yellow LED lights.



[4]If it is desired to use this section to begin programming with this parameter, then the following steps must be performed first:
a. Set FUNCTION switch to PROGRAM.
b. Press the channel number (1-5) that corresponds to the slot position of the plug-in to be programmed. A program summary for that channel is immediately printed.

[5]At this time, the PRESET key could also be pressed to change all of the parameters for all three outputs to factory-preset values.

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15. Press a "1,", "2", or "3", depending on which output you wish to change. (For this example, press "2".) The green LED adjacent to the ENTER key lights, waiting for the ENTER key to be pressed.

16. When the ENTER indicator goes out after the ENTER key is pressed, the message "OUTPUT B" is printed indicating the user selection. Then, a red indicator above the center bank of pushbuttons lights. This indicates that one of the functions (FNC, HI LIMIT, LO LIMIT, SENSITIVITY) may now be programmed.[6]

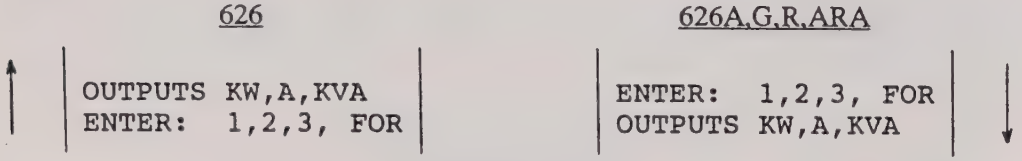
17. Press the LO LIMIT key and the following message appears:

```
LO LMI XXXX.0
```

18. Four yellow LEDs above the numeric keyboard are now lit. (For this example, enter 0250. Values less than 1000 must have leading zero(es) entered.) As each digit is pressed, one less LED is lit to indicate how many digits are left to be pressed. When finished, press the ENTER key. The value you just entered is printed.

To Set the Sensitivity Value (to 50 A)[7]

19. Note that the red LED next to the INPUT key is now lit. Press INPUT. The following prompt message is printed and a single yellow LED lights.



20. Press a "1,", "2", or "3", depending on which output you wish to change. (For this example, press "2".) The green LED adjacent to the ENTER key lights, waiting for the ENTER key to be pressed.

21. When the ENTER indicator goes out after the ENTER key is pressed, the message "OUTPUT B" is printed indicating the user selection. Then, a red indicator above the center bank of keys lights. This indicates that one of the functions (FNC, HI LIMIT, LO LIMIT, SENSITIVITY) may now be programmed.[6]

---

[6] At this time, the PRESET key could also be pressed to change all of the parameters for all three outputs to factory-preset values.

[7] If it is desired to use this section to begin programming with this parameter, then the following steps must be performed first:
   a. Set FUNCTION switch to PROGRAM.
   b. Press the channel number (1-5) that corresponds to the slot position of the plug-in to be programmed. A program summary for that channel is immediately printed.

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22. Press the SENS key and the following message appears:

```
SENS XXXX.0
```

23. Four yellow LEDs above the numeric keyboard are now lit. (For this example, enter 0050. Values less than 1000 must have leading zero(es) entered.) As each digit is pressed, one less LED is lit to indicate how many digits are left to be pressed. When finished, press the ENTER key. The value you just entered is printed.

24. The same sequence is used to change any of the outputs, provided that the appropriate number is entered when prompted by the printout. When programming Full Scale values for Current, note that the Full Scale values for kW and kVA are affected (since F.S. = 0.001*K*600*AMP F.S.).

25. When the plug-in program is completed, you may proceed to program another module (by pressing another channel number), or you may place the instrument on line by setting the FUNCTION switch to OPERATE. While on line, the program currently in effect may be obtained by simply pressing the PROG key. The completed program summary printout should take the form shown in FIGURE 2-4a (for the Model 626) or FIGURE 2-4b (for the Models 626A, 626R, 626ARA, and 626G).

```
F.S.    1800.0 KVA
HI LMT = 1350.0 KVA
LO LMT = 0450.0 KVA
SENS =  0090.0 KVA
        OUTPUT C

F.S.    1000.0 A
HI LMT = 0750.0 A
LO LMT = 0250.0 A
SENS =  0050.0 A
        OUTPUT B

F.S. =  1800.0 KW
HI LMT = 1350.0 KW
LO LMT = 0450.0 KW
SENS =  0090.0 KW
        OUTPUT A

626-PA-6025A
    CH2

PROGRAM SUMMARY
```

Full scale value of 1000 A
High Limit of 750 A
Low limit of 250 A
Sensitivity of 50 A

FIGURE 2-4a. TYPICAL PROGRAM SUMMARY PRINTOUT - MODEL 626

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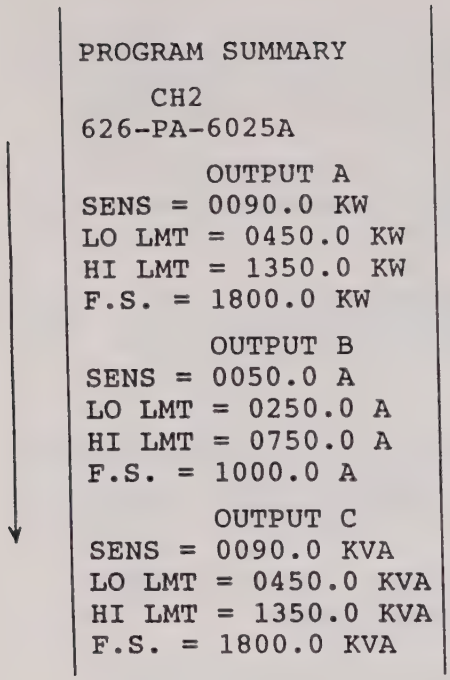

FIGURE 2-4b. TYPICAL PROGRAM SUMMARY PRINTOUT - MODELS 626A/G/R/ARA

NOTE: *The instrument is designed to detect an invalid entry. For example, if the high limit value is selected as 3000.0 and you select a low limit value of 3002.0 (with a Full Scale value of 9000), the following printout will appear:*

```
HI LIMIT ADJUST
LO LMT 3002
```

The new value for the high limit is equal to the low limit plus 0.1% of Full Scale (in this case, 3003.0).

2.3.4.2 Programming From A PC or Terminal (Remotely)

NOTE: *Refer to the Mainframe Manual for a complete listing of Remote Commands.*

In the example below, assume it is desired to program output B as follows:

Full Scale = 1000 A
High Limit = 750 A
Low Limit = 250 A
Sensitivity = 50 A

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To Set the Full Scale Value (to 1000 A)

1. Type "G" to enter PROGRAM mode.

2. Type a letter "a" through "e" corresponding to channels 1-5, or the slot position of the plug-in to be programmed. A program summary for that channel immediately appears on the screen.

3. Type "J". The following prompt message appears on the screen.

```
ENTER:  1,2,3, FOR
OUTPUTS KW,A,KVA
```

4. Type a "1,", "2", or "3", depending on which output you wish to change. (For this example, press "2".) Type "E" to ENTER.

5. The message "OUTPUT B" appears, indicating the user selection. One of the functions (FNC, HI LIMIT, LO LIMIT, SENSITIVITY) may now be programmed.[8]

6. Type the "<" key for setting Full Scale. The following message appears on the screen:

```
FNC = FULL SCALE
EXP:
X.XX00 = 0
XX.X00 = 1
XXX.00 = 2
XXX0.0 = 3
XXX00. = 4
```

NOTE: *If a "1" or "3" was selected in step 4, then the formula "0.001*K*600*AMF F.S." would also print. The value for Full Scale would have to be calculated using 1000 for AMP F.S. in the Formula.*

7. For this example, types a "3" to select a Full Scale range in the thousands range. Type "E" to ENTER the format. Enter the three digits corresponding to the X's in the above format. In this example, "100" is entered. If an error is made, press the DELETE key for CLEAR ENTRY and then enter the correct entry.

NOTE: *Regardless of which exponent you selected in step f, you are always prompted to enter 3 digits. The selection in step f determines where the decimal is. All three digits must be entered, even if they are zeros (0).*

[8] At this time, the PRESETs could also be selected to change all of the parameters for all three outputs to factory-preset values by typing "T".

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8. Type "E" to enter the value. The minimum Full Scale value that may be entered is 1, 0, 0 (1.00, 10.0, etc.). The following message appears, displaying the three digits just entered and a reminder to change the other parameters:

```
F.S. = 100
NOTE:  MUST CHANGE
SENS, LO LMT,HI LMT!
```

NOTE: *To view the actual Full Scale value (with decimal point and all digits), type "P" to print a program display.*

To Set the High Limit Value (to 750 A)[9]

9. Type "J". The following prompt message appears on the screen:

```
ENTER:  1,2,3, FOR
OUTPUTS KW,A,KVA
```

10. Type a "1,", "2", or "3", depending on which output you wish to change. (For this example, press "2".) Type "E" to ENTER. (For this example, press "2".)

11. The message "OUTPUT B" is appears indicating the user selection. One of the functions (FNC, HI LIMIT, LO LIMIT, SENSITIVITY) may now be programmed.[10]

12. Type "H" for HI LIMIT entry and the following message appears on the screen:

```
HI LMT XXXX.0
```

13. Enter the four digits corresponding to the four X's in the above format. (For this example, enter 0750. Values less than 1000 must have leading zero(es) entered.) Type "E" to ENTER. The value just entered is displayed.

---

[9] If it is desired to use this section to begin programming with this parameter, then the following steps must be performed first:
   a. Type "G" to enter PROGRAM mode.
   b. Type "a" through "e" corresponding to channels 1-5 or to the slot position of the plug-in to be programmed. A program summary for that channel immediately appears on the screen.

[10] At this time, the PRESETs could also be selected to change all of the parameters for all three outputs to factory-preset values by typing "T".

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To Set the Low Limit Value (to 250 A)[11]

14. Type "J". The following prompt message is displayed:

```
ENTER:  1,2,3, FOR
OUTPUTS KW,A,KVA
```

15. Type a "1,", "2", or "3", depending on which output you wish to change. (For this example, press "2".) Type "E" to ENTER.

16. The message "OUTPUT B" appears indicating the user selection. One of the functions (FNC, HI LIMIT, LO LIMIT, SENSITIVITY) may now be programmed.[12]

17. Type "L" for LO LIMIT entry and the following message appears on the screen:

```
LO LMI XXXX.0
```

18. Enter the four digits corresponding to the four X's in the above format. (For this example, enter 0250. Values less than 1000 must have leading zero(es) entered.) Type "E" to ENTER. The value just entered is displayed.

To Set the Sensitivity Value (to 50 A)[11]

19. Type "J". The following prompt message appears:

```
ENTER:  1,2,3, FOR
OUTPUTS KW,A,KVA
```

20. Type a "1,", "2", or "3", depending on which output you wish to change. (For this example, press "2".) Type "E" to ENTER.

21. The message "OUTPUT B" appears indicating the user selection. One of the functions (FNC, HI LIMIT, LO LIMIT, SENSITIVITY) may now be programmed.[12]

22. Type "S" for SENSitivity entry and the following message appears:

```
SENS XXXX.0
```

---

[11] If it is desired to use this section to begin programming with this parameter, then the following steps must be performed first:
   a. Type "G" to enter PROGRAM mode.
   b. Type "a" through "e" corresponding to channels 1-5 or to the slot position of the plug-in to be programmed. A program summary for that channel immediately appears on the screen.

[12] At this time, the PRESETs could also be selected to change all of the parameters for all three outputs to factory-preset values by typing "T".

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8. Type "E" to enter the value. The minimum Full Scale value that may be entered is 1, 0, 0 (1.00, 10.0, etc.). The following message appears, displaying the three digits just entered and a reminder to change the other parameters:

```
F.S. = 100
NOTE:  MUST CHANGE
SENS, LO LMT,HI LMT!
```

NOTE: *To view the actual Full Scale value (with decimal point and all digits), type "P" to print a program display.*

To Set the High Limit Value (to 750 A)[9]

9. Type "J". The following prompt message appears on the screen:

```
ENTER:  1,2,3, FOR
OUTPUTS KW,A,KVA
```

10. Type a "1,", "2", or "3", depending on which output you wish to change. (For this example, press "2".) Type "E" to ENTER. (For this example, press "2".)

11. The message "OUTPUT B" is appears indicating the user selection. One of the functions (FNC, HI LIMIT, LO LIMIT, SENSITIVITY) may now be programmed.[10]

12. Type "H" for HI LIMIT entry and the following message appears on the screen:

```
HI LMT XXXX.0
```

13. Enter the four digits corresponding to the four X's in the above format. (For this example, enter 0750. Values less than 1000 must have leading zero(es) entered.) Type "E" to ENTER. The value just entered is displayed.

---

[9] If it is desired to use this section to begin programming with this parameter, then the following steps must be performed first:
   a. Type "G" to enter PROGRAM mode.
   b. Type "a" through "e" corresponding to channels 1-5 or to the slot position of the plug-in to be programmed. A program summary for that channel immediately appears on the screen.

[10] At this time, the PRESETs could also be selected to change all of the parameters for all three outputs to factory-preset values by typing "T".

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To Set the Low Limit Value (to 250 A)[11]

14. Type "J". The following prompt message is displayed:

```
ENTER:  1,2,3, FOR
OUTPUTS KW,A,KVA
```

15. Type a "1,", "2", or "3", depending on which output you wish to change. (For this example, press "2".) Type "E" to ENTER.

16. The message "OUTPUT B" appears indicating the user selection. One of the functions (FNC, HI LIMIT, LO LIMIT, SENSITIVITY) may now be programmed.[12]

17. Type "L" for LO LIMIT entry and the following message appears on the screen:

```
LO LMI XXXX.0
```

18. Enter the four digits corresponding to the four X's in the above format. (For this example, enter 0250. Values less than 1000 must have leading zero(es) entered.) Type "E" to ENTER. The value just entered is displayed.

To Set the Sensitivity Value (to 50 A)[11]

19. Type "J". The following prompt message appears:

```
ENTER:  1,2,3, FOR
OUTPUTS KW,A,KVA
```

20. Type a "1,", "2", or "3", depending on which output you wish to change. (For this example, press "2".) Type "E" to ENTER.

21. The message "OUTPUT B" appears indicating the user selection. One of the functions (FNC, HI LIMIT, LO LIMIT, SENSITIVITY) may now be programmed.[12]

22. Type "S" for SENSitivity entry and the following message appears:

```
SENS XXXX.0
```

---

[11] If it is desired to use this section to begin programming with this parameter, then the following steps must be performed first:
   a. Type "G" to enter PROGRAM mode.
   b. Type "a" through "e" corresponding to channels 1-5 or to the slot position of the plug-in to be programmed. A program summary for that channel immediately appears on the screen.

[12] At this time, the PRESETs could also be selected to change all of the parameters for all three outputs to factory-preset values by typing "T".

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23. Enter the four digits corresponding to the four X's in the above format. (For this example, enter 0050. Values less than 1000 must have leading zero(es) entered.) Type "E" to ENTER. The value just entered is displayed.

24. The same sequence is used to change any of the outputs, provided that the appropriate number is entered when prompted by the display. When programming Full Scale values for current note that the Full Scale Values for kW and kVA are affected (since F.S.= 0.001*K*600*AMP F.S.).

25. When the plug-in program is completed, you may proceed to program another module (by pressing another channel number), or you may place the instrument on line by typing "O" for OPERATE mode. While on line, the program currently in effect may be obtained by simply typing "P" for PROGram Summary. See FIGURE 2-5 for an example of the program summary that will appear on the screen.

NOTE: *The instrument is designed to detect an invalid entry. For example, if the high limit value is selected as 3000.0 and the user selects a low limit value of 3002.0 (with a Full Scale value of 9000), the following printout will appear:*

```
HI LIMIT ADJUST
LO LMT 3002
```

The new value for the high limit is equal to the low limit plus 0.1% of Full Scale (in this case, 3003.0).

```
PROGRAM SUMMARY
    CH2
626-PA-6025A
        OUTPUT A
SENS = 0090.0 KW
LO LMT = 0450.0 KW
HI LMT = 1350.0 KW
F.S. = 1800.0 KW
        OUTPUT B
SENS = 0050.0 A
LO LMT = 0250.0 A
HI LMT = 0750.0 A
F.S. = 1000.0 A
        OUTPUT C
SENS = 0090.0 KVA
LO LMT = 0450.0 KVA
HI LMT = 1350.0 KVA
F.S. = 1800.0 KVA
```

Sensitivity of 50 A
Low limit of 250 A
High Limit of 750 A
Full scale value of 1000 A

FIGURE 2-5. TYPICAL PROGRAM SUMMARY DISPLAY

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2.3.5 Description of Data Printouts

Various types of data printouts are available. These include:

Over Limit
Under Limit
Output Changes
Data Summary

The following subsections explain what's included in and how to obtain the various types of Data Printouts available. Examples of the various types of Data Printouts are included.

2.3.5.1 Over Limit

An over limit condition exists when the monitored signal exceeds the user-specified upper limit for the respective input. An over limit condition is indicated by a printout such as the following:

```
4B HI 10:47:12.98
```

or

```
4A HI 10:47:09.76
```

Where the 4 is the channel number, B is for output B (or 2), A is for the output A (or 1), and the time is given in hours, minutes, and seconds (to 0.01 sec resolution).

When the output recovers to normal, a printout such as the following occurs:

	626	626A,G,R,ARA	
↑	4B NOR 10:55:13.77 1380.7 KVA MAX	1379.5 KW MAX 4A nor 11:12:34.21	↓
	or	or	
↑	4A NOR 11:12:34.21 1379.5 KW MAX	1380.7 KVA MAX 4B NOR 10:55:13.77	↓

This indicates when the value was restored to normal and the value of the highest scaled value reached during the over limit interval.

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2.3.5.2 Under Limit

An under limit condition exists when the monitored signal goes below the user-specified low limit. An under limit condition is indicated by a printout such as the following:

```
4A LO 12:33:23.78
```

or

```
4C LO 12:59:00.01
```

When the voltage returns to normal, a message such as the following is printed:

626

```
4A NOR 13:44:56.98
   455.6 KW MIN
```

or

```
4C nor 12:59:58.99
459.1 KVA MIN
```

626A,G,R,ARA

```
459.1 KVA MIN
4C NOR 12:59:58.99
```

or

```
   455.6 KW MIN
4A NOR 13:44:56.98
```

This indicates when the normal condition was restored and the value of the lowest scaled value reached during the under limit interval.

2.3.5.3 Output Changes

A INC/DEC printout is triggered when the voltage changes more than a preselected amount from the last printed value. The change sensitivity is a user programmable value, which is selected independently for each input. The following example show several output changes. The first is an current increase to 0379.3 A on input B; the second is an apparent power decrease on channel C (both at times shown).

626

```
2C DEC 01:22:34.76
   695.2 KVA

2B INCL 01:23:55.32
    0379.3 A
```

626A,G,R,ARA

```
    0379.3 A
2B INCL 01:23:55.32

   695.2 KVA
2C DEC 01:22:34.76
```

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2.3.5.4 Data Summary

A printout of the present value, minimum and maximum values and number of over-limit and under-limit events may be triggered manually by pressing the DATA key. This also occurs automatically at midnight.

Below are two typical Data Summary printouts. The first one is for the Model 626, the second one is for all other models of the Series 626:

626

```
MAX  1620.9 KVA
HIGH  005 HT
MIN  0000.0 KVA
LOW  007 HT
PRES 0028.5 KVA
  OUTPUT C

MAX  3322.8 A
HIGH  005 HT
MIN  000.0 A
LOW  011 HT
PRES 0297.3 A
  OUTPUT B

MAX  1600.6 KW
HIGH  005 HT
MIN  0000.0 KW
LOW  007 HT
PRES 0028.5 KW
  OUTPUT A

626-PA-6025A
    CH2
12/19/89   10:46:15
DATA SUMMARY
```

626A,G,R,ARA

```
     DATA SUMMARY
12/19/89   10:46:15
         CH2
626-PA-6025A

  OUTPUT A
PRES 0028.5 KW
LOW  007 HT
MIN  0000.0 KW
HIGH  005 HT
MAX  1600.6 KW

  OUTPUT B
PRES 0297.3 A
LOW  011 HT
MIN  000.0 A
HIGH  005 HT
MAX  3322.8 A

  OUTPUT C
PRES 0028.5 KVA
LOW  007 HT
MIN  0000.0 KVA
     HIGH  005 HT
MAX  1620.9 KVA
```

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2.3.5.5 Printout Modes

Printouts showing how various settings of the PRINTOUT MODE switch change the amount of detail in the printed record of the same disturbance sequence are shown on the following pages. It is assumed that the disturbances occurred on the outputs as shown, and that the limits for the outputs were programmed as follows:

	kW	AMPS	kVA
FULL SCALE	1800	3000	1800
HIGH LIMIT	1350	2250	1350
LOW LIMIT	450	750	450
SENSITIVITY	90	150	90

Maximum detail records all changes.

Normal detail records increments and decrements out of the normal range.

Out of limits records only when limits are crossed. Increments and decrements are not recorded.

Summary Only records only the number of hits and the worst case in each category (hi and low of A, kVA, and kW).

Disturbances which occur while the PRINTOUT MODE switch is in the SUMMARY ONLY position do not generate individual printouts, but are stored in the daily accumulator and automatically printed each day at midnight (worst case event and number of occurrences in each category).

The sample printouts on the following pages are presented in the format printed out by the models 626A, 626ARA, 626G, and 626R. Printouts for the model 626 would contain the same content and amount of detail, but the lines appear in reverse order. Printouts in maximum detail, normal detail, and out of limits are included.

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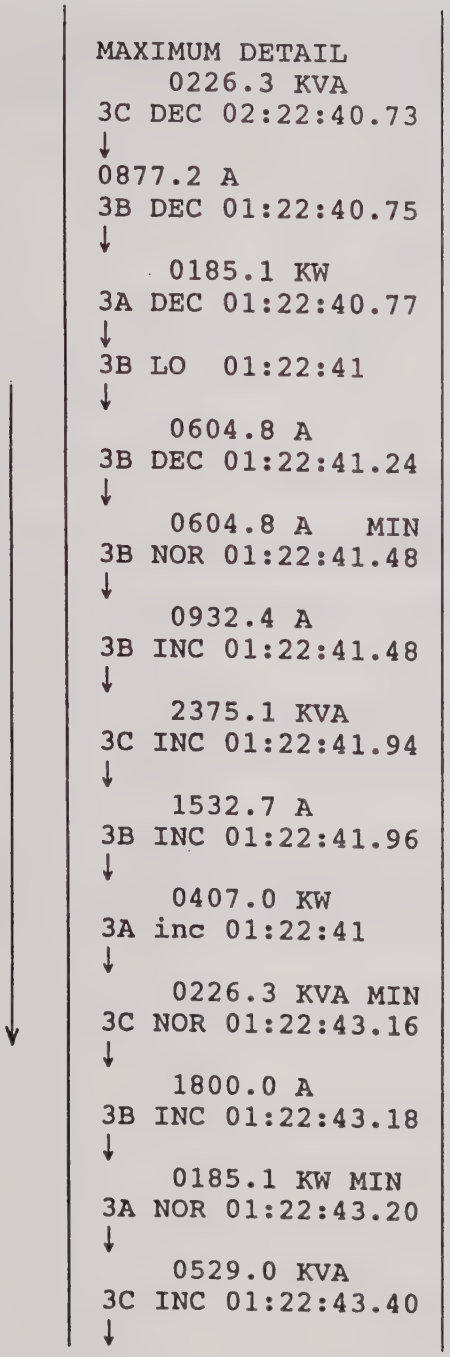
Maximum Detail Example:



kVA decrease

Amp decrease

kW decrease

Current output below Low Limit of 750 A

Current decrease

Min Current of 604.8 A recorded before returning above Lo Limit crossing 750 A

Current increase

kVA increase

Current Increase

kW increase

Min of 226.3 kVA recorded before returning above 450 kVA Lo Limit

Current increase

Min of 185.1 kW recorded before above 450 kVA

kVA increase

Continued on next page.

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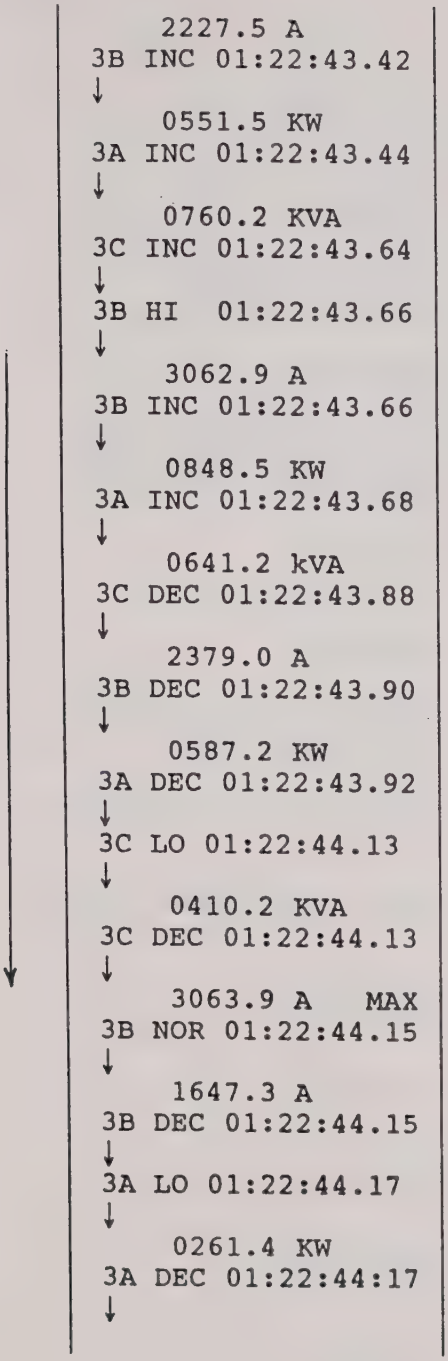
Maximum detail continued...



2227.5 A 3B INC 01:22:43.42	Current Increase
0551.5 KW 3A INC 01:22:43.44	kW increase
0760.2 KVA 3C INC 01:22:43.64	kVA increase
3B HI 01:22:43.66	Current above Hi Limit of 2250 A
3062.9 A 3B INC 01:22:43.66	Current increase
0848.5 KW 3A INC 01:22:43.68	kW increase
0641.2 kVA 3C DEC 01:22:43.88	kVA decrease
2379.0 A 3B DEC 01:22:43.90	Current decrease
0587.2 KW 3A DEC 01:22:43.92	kW decrease
3C LO 01:22:44.13	KVA below Low Limit
0410.2 KVA 3C DEC 01:22:44.13	KVA decrease
3063.9 A MAX 3B NOR 01:22:44.15	Current returned below HI Limit MAX of 3063.9 A recorded
1647.3 A 3B DEC 01:22:44.15	Current decreases
3A LO 01:22:44.17	kW goes below LO Limit of 450 kW
0261.4 KW 3A DEC 01:22:44:17	kW decreases

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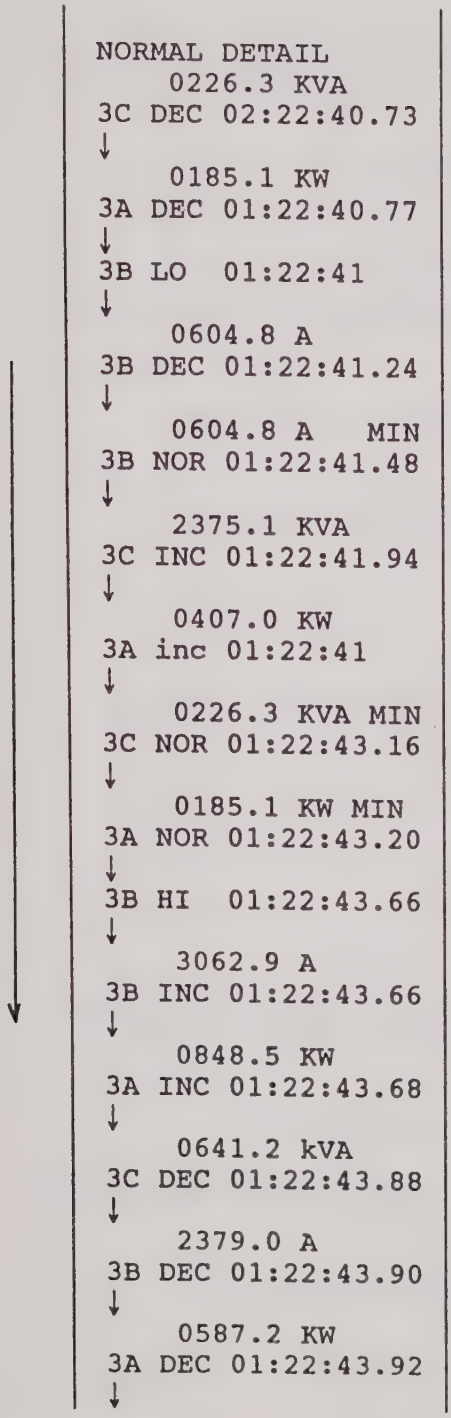
Normal Detail Example:



kVA decrease

kW decrease

Current output below Low Limit of 750 A

Current decrease

Min Current of 604.8 A recorded before returning above Lo Limit crossing 750 A

kVA increase

kW increase

Min of 226.3 kVA recorded before returning above 450 kVA Lo Limit

Min of 185.1 kW recorded before above 450 kVA

Current above Hi Limit of 2250 A

Current increase

kW increase

kVA decrease

Current decrease

kW decrease

Continued on next page.

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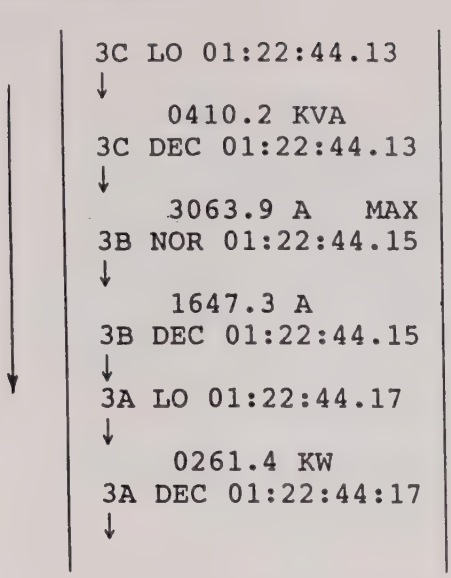
Normal detail continued...



KVA below Low Limit

KVA decrease

Current returned below HI Limit
MAX of 3063.9 A recorded

Current decreases

kW goes below LO Limit of 450 kW

kW decreases

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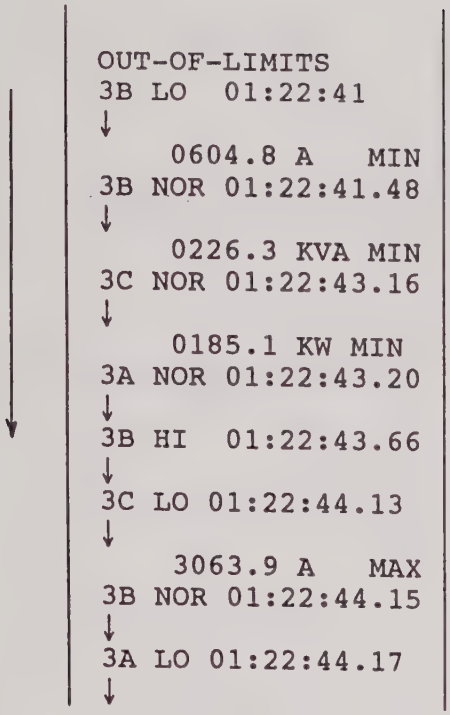
Out of Limits Example:



Current output below Low Limit of 750 A
Min Current of 604.8 A recorded before returning above Lo Limit crossing 750 A
Min of 226.3 kVA recorded before returning above 450 kVA Lo Limit

Min of 185.1 kW recorded before above 450 kVA

Current above Hi Limit of 2250 A

KVA below Low Limit

Current returned below HI Limit
MAX of 3063.9 A recorded

kW goes below LO Limit of 450 kW

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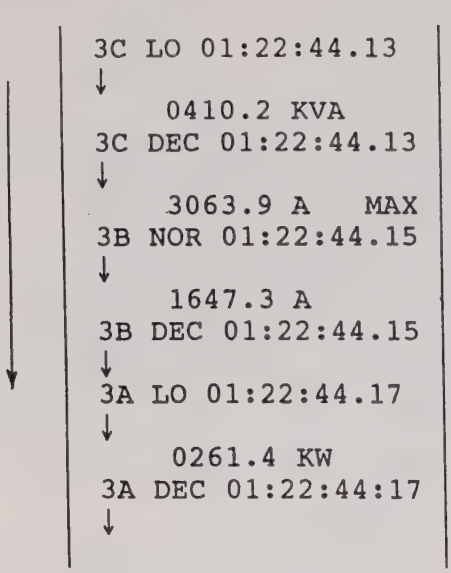
Normal detail continued...



KVA below Low Limit

KVA decrease

Current returned below HI Limit
MAX of 3063.9 A recorded

Current decreases

kW goes below LO Limit of 450 kW

kW decreases

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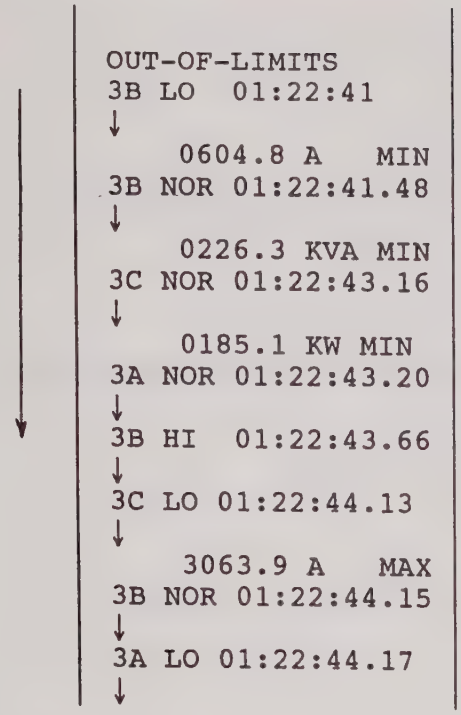
Out of Limits Example:



Current output below Low Limit of 750 A

Min Current of 604.8 A recorded before returning above Lo Limit crossing 750 A

Min of 226.3 kVA recorded before returning above 450 kVA Lo Limit

Min of 185.1 kW recorded before above 450 kVA

Current above Hi Limit of 2250 A

KVA below Low Limit

Current returned below HI Limit MAX of 3063.9 A recorded

kW goes below LO Limit of 450 kW

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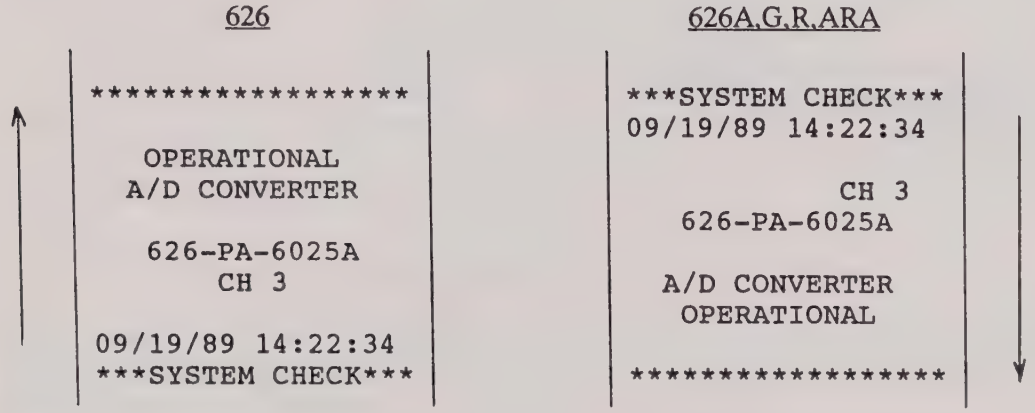
SECTION III
OPERATIONAL TEST

3.1 GENERAL

This section provides information for performing an operational test to verify that the 6025A plug-in is operating properly.

3.2 SYSTEM CHECK

When the PRINTOUT mode switch is momentarily set to "SYSTEM CHECK" and then back to its original setting, a convert signal is sent to the A/D converter to check for operational integrity. If the A/D converter is operating properly, the module will send the following sample printout:



3.3 PLUG-IN SELF DIAGNOSTICS

The following test is performed by the 6025A software:

> The A/D converter will try a conversion for 128 tries. If for some reason the A/D conversion is not performed, a software time-out will print a "CONVERT ERROR" message. Should this message occur, the plug-in should be returned for factory service.

(Refer to Subsection 1.9 for further information on Factory Repair.)

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3.4 CALIBRATION INTERVAL

The recommended calibration interval for the 626-PA-6025A plug in is once every **12 MONTHS.**

We recommend that you return the unit to the factory for calibration. If you decide to do so, first contact Dranetz Customer Service Department to obtain an authorization number.

Telephone No:	(201) 287-3680	Telex:	499-7808
TWX:	(710) 997-9553	Cable:	DRANETZ
FAX:	(201) 248-9240		

Then fill out the Repair/Service Order form[1] enclosed in this manual and ship it along with the unit to Dranetz Customer Service Department at the following address:

Dranetz Customer Service Department
Dranetz Technologies, Inc.
4 Gladys Court
Edison, NJ 08818

[1] If this form is missing, ask Dranetz Customer Service for a replacement.

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APPENDIX A
ASSEMBLING INTERFACE CABLE USING OPTIONAL CABLE ACCESSORY KIT

A.1 GENERAL

A 100 foot Interface cable (P/N 114604-G4) is provided when purchasing the 6025A. An optional Interface Cable Accessory Kit (P/N 114604-G5) is available for those wishing to make their own cable.

Directions are provided in this section for making your own cable using the connectors, socket contacts and strain reliefs provided in the Interface Cable Accessory Kit 114604-G5. The following is a list of manufacturer part numbers for the 6 twisted pair, individually foil shielded, 22 AWG, 12 conductor shielded cable required if assembling your own cable:

Manufacturer	Part Number
Alpha	6012
Belden	8778
Dearborn	962206

The cable length should not exceed 100 feet.

A.2 ASSEMBLY PROCEDURE

To attach the wires to the pins provided in the accessory bag for use with the 626-PA-6025A, AMP tool #90300-2 is recommended. If this tool is not available, follow the alternate steps included in the procedure below.

1) On one end of the six twisted pair cable, cut the jacket back 4 3/4 inches, untwist each pair, and cut the foil shields (not the drain wires) back even with the jacket.

2) Separate the drain wire from each pair, twist all 6 drain wires together at the end of the jacket, and cut 5 of the drain wires short, leaving one long. The drain wires should be soldered together at the twist. Heat shrink tubing may be used to cover the end of the jacket, if desired. It is recommended that insulated sleeving be installed on the drain wire.

3) Twist each wire pair together so that the black return wire for each colored wire can be readily identified.

4) Strip the insulation back 1/5" on the remaining 6 pair of wires and tin the wires.

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5) Use AMP tool #90300-2 to crimp the end of each wire. If this tool is not available, tin the end of each wire by following the steps outlined below.

5a) Insert a wire into a pin until 1/16" of insulation is touching the pin (so edge of insulation is even with the first (outer) set of tabs). Bend these tabs tightly over the insulated wire, one at a time, with needle-nose pliers.

5b) Bend the inner tabs tightly over the stripped wire, one at a time, with needle-nose pliers.

5c) Apply a soldering iron to the inner tab. After heating for several seconds, apply a small amount of rosin core solder to the point of contact. Let flow for several seconds and remove the soldering iron. Do not heat too long or the insulation may melt.

6) Repeat for the remaining eleven wires plus drain wire.

7) When the pins have cooled, group the wire pairs together as follows:

Group 1	Group 2
RED	BLUE
WHITE	YELLOW
GREEN	BROWN
DRAIN	

If desired, slip heatshrink tubing over each group.

8) Starting with the 8 position connector, refer to contact numbers stamped on the rear of connector and insert the pins as follows, until a click is felt.

a. Red wire into hole number 8.
b. Black wire associated with red wire into hole number 7.

c. White wire into hole number 6.
d. Black wire associated with white wire into hole number 5.

e. Green wire into hole number 4.
f. Black wire associated with green wire into hole number 3.

g. Hole number 2 left open.
h. Drain wire into hole number 1.

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9) Install strain relief on connector. (Refer to FIGURE A-1.)

10) Refer to contact numbers stamped on the rear of connector and insert the pins in the 6 position connector as follows, until a click is felt.

a. Blue wire into hole number 6.
b. Black wire associated with blue wire into hole number 5.

c. Yellow wire into hole number 4.
d. Black wire associated with yellow wire into hole number 3.

e. Brown wire into hole number 2.
f. Black wire associated with brown wire into hole number 1.

11) Install strain relief on connector.

This finishes the plug end of the wire.

12) On the other end of the cable, cut the jacket back 5 inches. Untwist each pair, and cut the foil shields and the drain wires back even with the jacket. Retwist each wire pair together so that the black return wire for each colored wire can be readily identified.

13) Strip the insulation back 1/4" on each wire and tin the wires
Heatshrink tubing may be used to cover the end of the jacket, if desired.

14) Connect the wires to the terminal inputs as indicated below.

6 V Rms MAX	Voltage Phase A+	RED
	Voltage Phase A-	BLACK
	Voltage Phase B+	WHITE
	Voltage Phase B-	BLACK
	Voltage Phase C+	GREEN
	Voltage Phase C-	BLACK
35 mA Rms MAX	Current Phase A+	BLUE
	Current Phase A-	BLACK
	Current Phase B+	YELLOW
	Current Phase B-	BLACK
	Current Phase C+	BROWN
	Current Phase C-	BLACK

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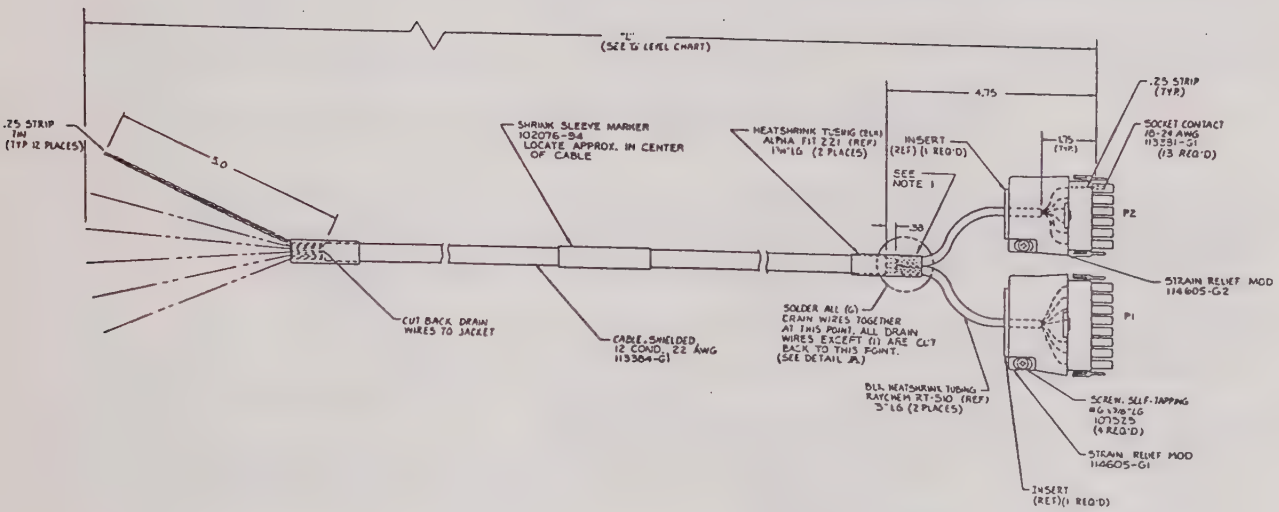

FIGURE A-1. CABLE ASSEMBLY DIAGRAM.

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ADDENDUM TO

626-PA-6025A
3-PHASE POWER DEMAND MONITOR

Volume 1, Operator's Manual

AD-1 GENERAL

626-PA-6025A plug-ins shipped after February, 1991 have been hardware modified to correct a measurement error when monitoring 3-wire (delta) loads. Other 6025A plug-ins may have been retrofitted with the modification. The modification consists of a two-position switch at the card edge connector end of the plug-in, as illustrated in FIGURE 1 below.

This addendum gives information pertaining to configuring the modified 626-PA-6025A for a 3 wire (delta) lode or for a 4-wire (wye) load.

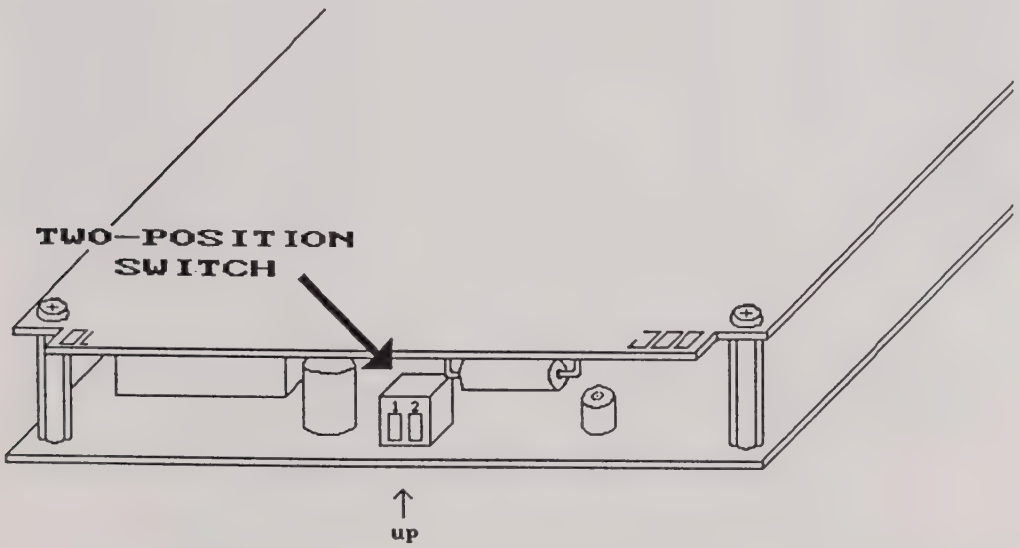
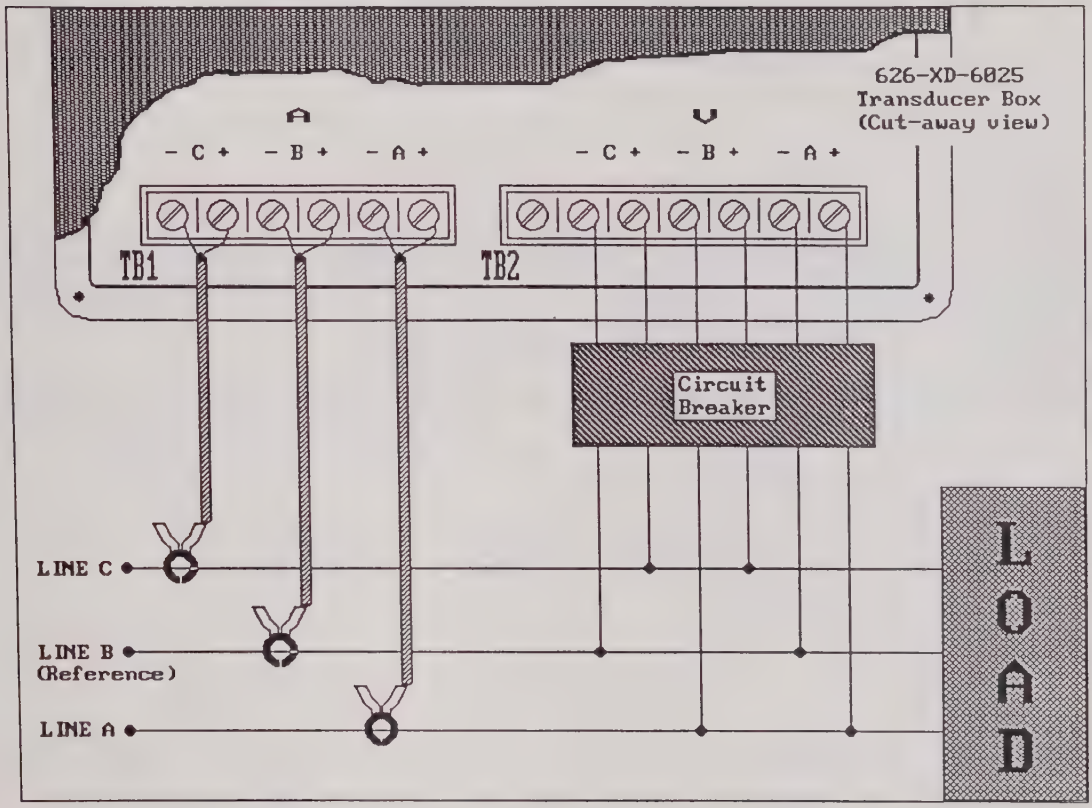


FIGURE 1. TWO-POSITION SWITCH LOCATION.

3-WIRE (DELTA) LOADS

To measure a 3-wire load, the 6025A measurement inputs must be configured according to FIGURE 2 below.



Note: Lines A and C must be attached to voltage input B as shown to measure the correct apparent power. Total current measurement requires all three current probes to be attached.

FIGURE 2. 3 PHASE DELTA (3 WIRE)

The two-position switch must be set as follows:

Position 1	Open (Down)
Position 2	Closed (Up)

AD-3 4-WIRE (WYE) LOADS

To measure a 4-wire (wye) load, the 6025A measurement inputs must be configured according to FIGURE 3 below.

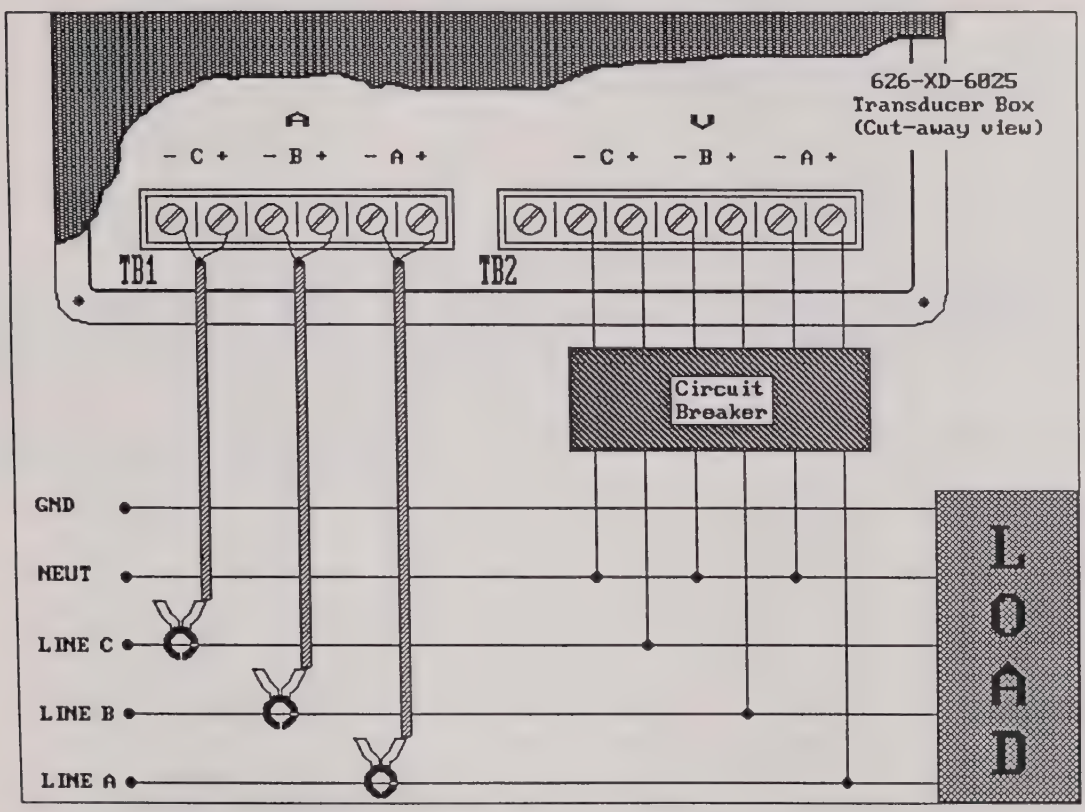


FIGURE 3. 3 PHASE WYE (4 WIRE)

The two-position switch must be set as follows:

Position 1	Closed (Up)
Position 2	Open (Down)

AD-4 PLUG-INS WITHOUT THE MODIFICATION

If the two-position switch is not in the indicated location on your 6025A plug-in, then the plug-in has not been modified. This will not affect measuring 4-wire (wye) loads. However, if the plug-in will be used to measure 3-wire (delta) loads, it must be sent back to Dranetz to be modified. Contact the Dranetz Customer Service Department for details.

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Dranetz Technologies, Inc.
1000 New Durham Road
Edison, N.J. 08818

Phone: (908) 287-3680
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ADDENDUM TO

626-PA-6025A
3-PHASE POWER DEMAND MONITOR

Volume 1, Operator's Manual

AD-1 GENERAL

626-PA-6025A plug-ins shipped after February, 1991 have been hardware modified to correct a measurement error when monitoring 3-wire (delta) loads. Other 6025A plug-ins may have been retrofitted with the modification. The modification consists of a two-position switch at the card edge connector end of the plug-in, as illustrated in FIGURE 1 below.

This addendum gives information pertaining to configuring the modified 626-PA-6025A for a 3 wire (delta) lode or for a 4-wire (wye) load.

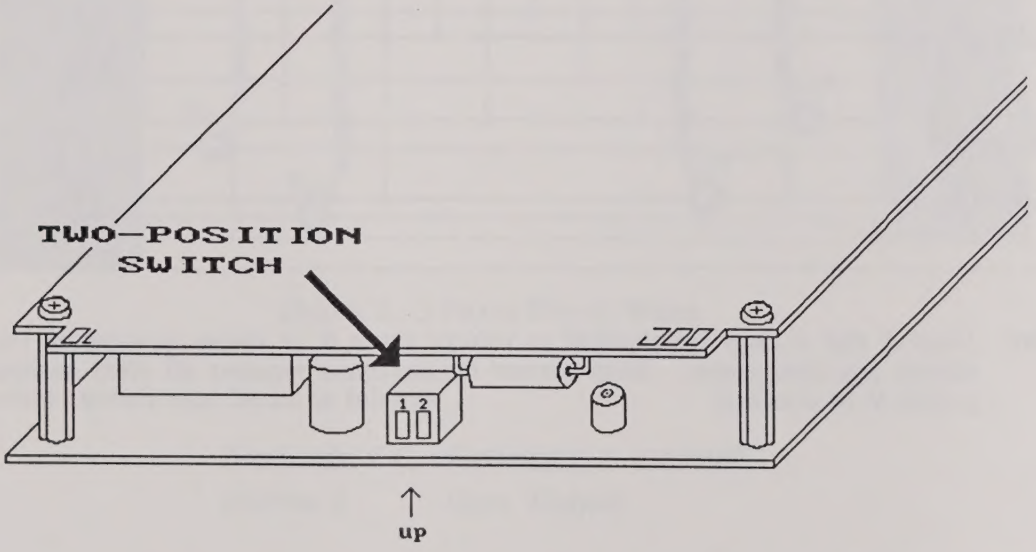
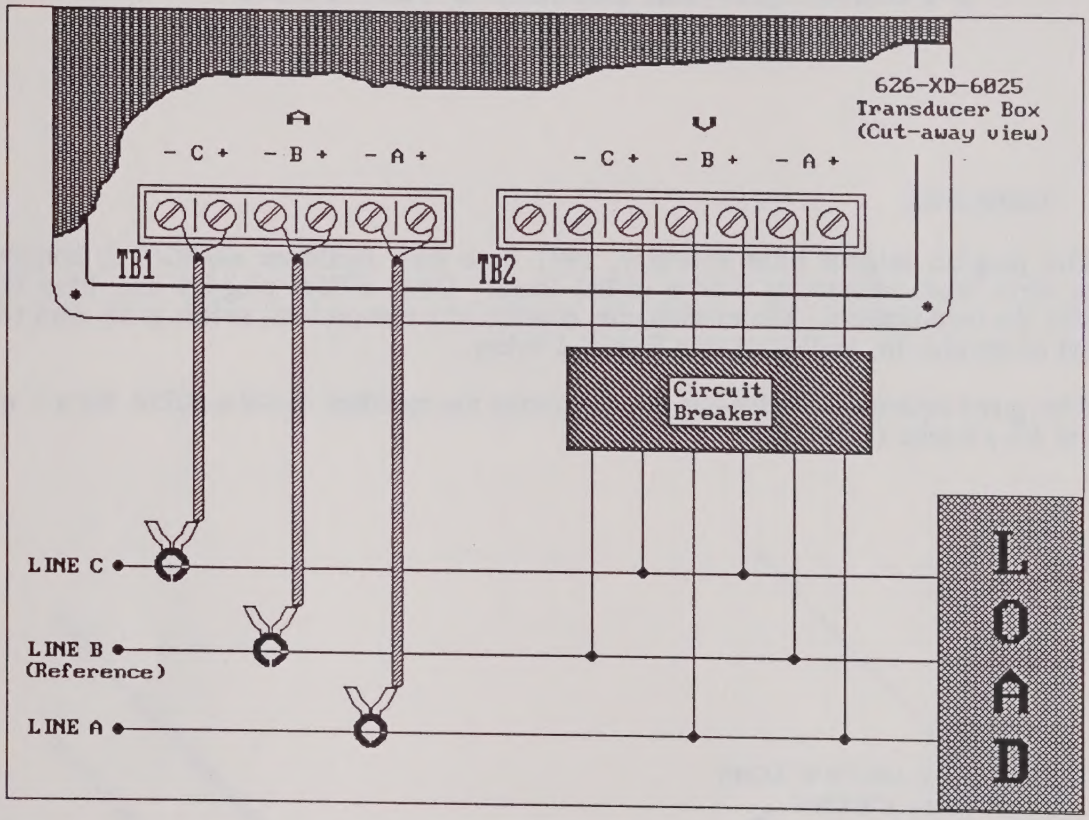


FIGURE 1. TWO-POSITION SWITCH LOCATION.

AD-2 3-WIRE (DELTA) LOADS

To measure a 3-wire load, the 6025A measurement inputs must be configured according to FIGURE 2 below.



Note: Lines A and C must be attached to voltage input B as shown to measure the correct apparent power. Total current measurement requires all three current probes to be attached.

FIGURE 2. 3 PHASE DELTA (3 WIRE)

The two-position switch must be set as follows:

Position 1	Open (Down)
Position 2	Closed (Up)

AD-3 4-WIRE (WYE) LOADS

To measure a 4-wire (wye) load, the 6025A measurement inputs must be configured according to FIGURE 3 below.

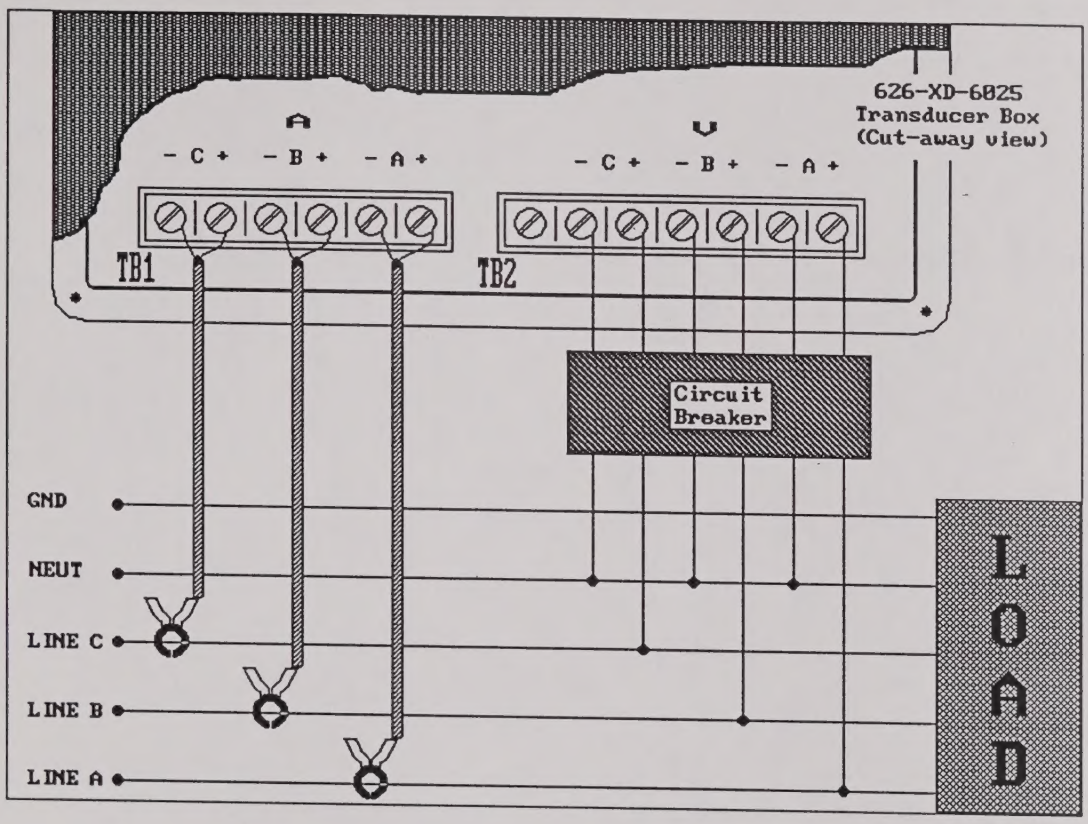


FIGURE 3. 3 PHASE WYE (4 WIRE)

The two-position switch must be set as follows:

Position 1	Closed (Up)
Position 2	Open (Down)

AD-4 PLUG-INS WITHOUT THE MODIFICATION

If the two-position switch is not in the indicated location on your 6025A plug-in, then the plug-in has not been modified. This will not affect measuring 4-wire (wye) loads. However, if the plug-in will be used to measure 3-wire (delta) loads, it must be sent back to Dranetz to be modified. Contact the Dranetz Customer Service Department for details.

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